EFFECT OF ADDING DEXMEDETOMIDINE vs FENTANYL TO INTRATHECAL BUPIVACAINE ON SPINAL BLOCK CHARACTERISTICS IN GYNECOLOGICAL PROCEDURES: DOUBLE BLINDED CONTROL STUDY

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CERTIFICATE

This is to certify that the dissertation entitled, **"EFFECT OF ADDING DEXMEDETOMIDINE vs FENTANYL TO INTRATHECAL BUPIVACAINE ON SPINAL BLOCK CHARACTERISTICS IN GYNECOLOGICAL PROCEDURES: DOUBLE BLINDED CONTROL STUDY"** Submitted by Dr. Devikala Loganathan in partial fulfillment for the award of the degree of Doctor of Medicine in Anaesthesiology by the Tamilnadu Dr. M.G.R. Medical University, Chennai is bonafide record of the work done by her in the INSTITUTE OF ANAESTHESIOLOGY & CRITICAL CARE, Madras Medical College, during the academic year 2008-2011.

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Contents

INTRODUCTION

Spinal Anaesthesia is used extensively for lower abdominal and lower extremity surgeries, because it has distinct advantages over general Anaesthesia. Lignocaine and Bupivacaine are the commonly used local anesthetic agents for spinal anesthesia. The adjuvants like opioids and α2 agonist are sometimes combined with Local anaesthetic for spinal anaesthesia. The rationale for combining adjuvants to local anaesthetic drugs is to lower the dose of each agent, and maintaining analgesic efficacy whilst reducing the incidence and severity of side effects.

Surgery on the uterus and other genital organs performed under spinal or epidural block is often accompanied by visceral pain, nausea and vomiting. Fentanyl in various doses when added to spinal Bupivacaine increase the duration of analgesia and reduce intra operative nausea and vomiting. Dexmedetomidine is a α2-agonist that is approved as an intra venous sedative and co-analgesic drug.

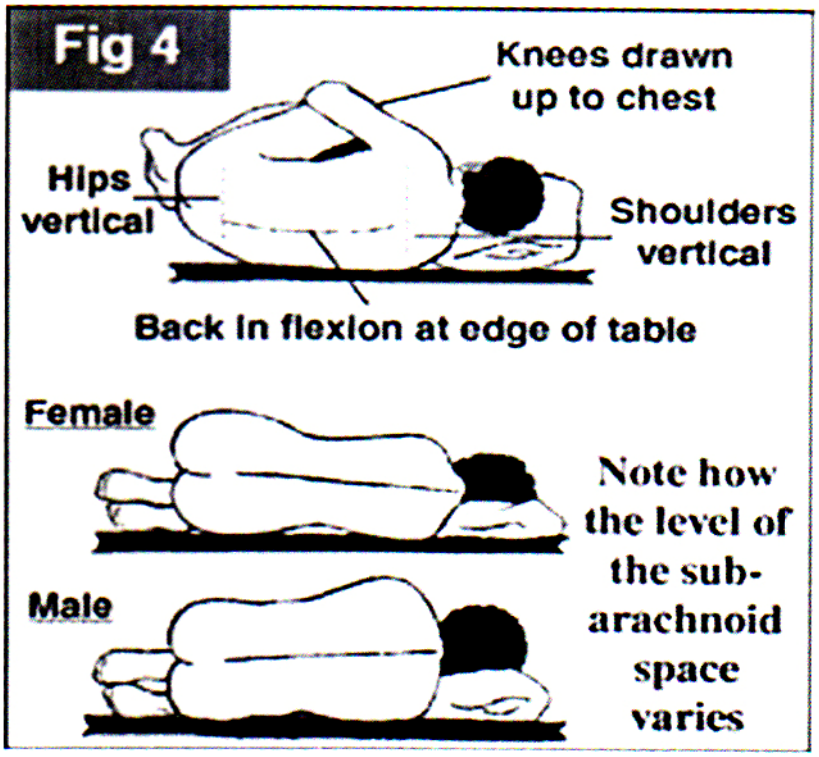
Most of the clinical studies about intrathecal α2 adreno receptor agonist are related to clonidine. The present study was designed to evaluate the efficacy and adverse effects of 5µg Dexmedetomidine Vs 25µg of Fentanyl when added to 0.5% Hyperbaric Bupivacaine administered intrathecally in patients undergoing elective vaginal surgeries.

AIM OF THE STUDY

To compare the effect of addition of Dexmedetomidine Vs Fentanyl to 0.5% Hyperbaric Bupivacaine administered intrathecally for vaginal surgeries with respect to

- Time to onset of sensory and motor block.
- Duration of sensory and motor block.
- Quality of intra operative anaesthesia.
- Time for demand analgesia.
- Side effects.

POSITION OF THE PATIENTS



SPINAL ANAESTHESIA

Spinal (subarachnoid/ intrathecal) anaesthesia is a form of central neuraxial block in which a temporary interruption of nerve transmission is achieved following injection of local anaesthetic and / or adjuvant solutions into the subarachnoid space.

Spinal anaesthesia is one of the most frequently employed methods of regional anaesthesia.

ANATOMY

The Vertebral canal extends from the foramen magnum to the sacral hiatus. It is formed by the dorsal spine, pedicles and laminae of successive vertebrae (7cervical, 12 thoracic, 5 lumbar, and 5 sacral). The vertebrae are held together by a series of overlapping ligaments namely, the anterior and posterior longitudinal ligaments, ligamentum flavum, interspinous ligament, supraspinous ligament and the intervertebral discs.

The spinal cord, a direct continuation of the medulla oblongata begins at the upper border of the atlas and terminates distally in the conus medullaris. The distal termination, because of the differential growth rates between the bony vertebral canal and central nervous system varies from L3 in the infant, to the lower border of L1 in the adult.

Surrounding the spinal cord in the bony vertebral column are three membranes- (from within to the periphery); the pia mater, arachnoid mater and dura mater. The pia mater is a highly vascular membrane that closely invests the spinal cord. The arachnoid mater is a delicate non vascular membrane closely attached to the outer most dura mater.

Between the two innermost membranes is the subarachnoid space. In this space cerebrospinal fluid (CSF), spinal nerves, blood vessels that supply the spinal cord and dentate ligaments are present. Although the spinal cord ends at the lower border of L1 in adults, the subarachnoid space continues to S2 level. The outermost membrane in the spinal cord is the longitudinally organized fibroelastic membrane, the dura mater. This layer is the direct extension of the cranial dura mater and extend as the spinal dura mater from the foramen magnum to S2, where the filum terminale (as extension of the pia mater beginning at conus medullaris) blends with the periosteum of the subdural space which contains only small amounts of serous fluid to allow the dura and arachnoid move over each other. Surrounding the dura mater is the epidural space which extends from the foramen magnum to the sacral hiatus. Posterior to the epidural space is the ligamentum flavum. Immediately posterior to the ligmentum flavum is the interspinous ligament. Extending from the external

occipital protuberance to the coccyx, posterior to this structure is the supraspinous ligament.

Lumbar puncture is routinely done below the L2 vertebrae down to the L5-S1 interspace to avoid damage to the spinal cord which ends at the lower border of L1 vertebrae in adults.

PHYSIOLOGY OF SUBARACHNOID BLOCK

Cerebrospinal fluid

The cerebrospinal fluid (CSF) is an ultrafiltrate of blood plasma which is in hydrostatic and osmotic equilibrium. It is a clear, colourless fluid found in the spinal and cranial subarachnoid space and in the ventricles of the brain. The average volume in the adults ranges from 120 to 150 ml of which 35 ml in the ventricles, 25 ml is in the cerebral subarachnoid space and 75 ml is in the spinal subarachnoid space. It is secreted by the choroidal plexus at a rate of 0.3-0.4 ml/minute.

Physical characteristics of cerebrospinal fluid[9]

PH	7.4
Specific gravity — referred to Water	
• At body temperature	1.007
• At 4 deg C	1.0003
Density	1.0003 g/ml

Baricity	1.000
Pressure	8-12 mm Hg / 70-80 cm H2O
Cells	3-5 /cu.mm
Proteins	20mg/dl
Glucose	45-80 mg/dl

The cerebrospinal fluid plays an important role in spinal anesthesia as a media for dispersion of the local anaesthetic drug to the spinal nerve. An important factor determining the spread of drugs in the subarachnoid space is the specific gravity of the injected solution compared with that of CSF.

Mechanism of spinal Anaesthesia

Injection of local anaesthetics into the spinal CSF allows access to sites of action both within the spinal cord and the peripheral nerve roots. The nerve roots leaving the spinal canal are not covered by epineurium and are readily exposed to the local anaesthetic within the CSF. Therefore afferent impulses leaving via the ventral nerve roots are blocked during spinal anaesthesia. Spinal local anaesthetics block sodium channels and electrical conduction in spinal nerve roots. There are also multiple potential action of local anaesthetics within the spinal cord at different sites. Local anaesthetics can exert sodium channel block within the dorsal and ventral horns, inhibiting generation and propagation of electrical activity[10] The order in which nerve fibers are blocked in spinal

anaesthesia is preganglionic sympathetic B fibers followed by temperature fibers (cold before warmth), fibers carrying pin prick sensation, tough, deep pressure, and proprioceptive impulses. Recovery is roughly in the reverse order.

Spread of LA in the subarachnoid space

The local anaesthestic solution is diluted in the CSF and therefore its original concentration is of less potent than the actual solution of mass of drug injected. Spread is also determined by the baricity of the injected solution. Baricity is a ratio comparing the density of LA solution at a specified temperature to the density of CSF at the same temperature. A hypobaric solution has a baricity less than 1.0000 or specific gravity less than 1.0069. (mean value of CSF specific gravity).

A hyperbaric solution has a baricity greater than 1.0000 or specific gravity more than 1.0069. Hypobaric and hyperbaric solutions are prepared from isobaric solutions by addition of various amounts of sterile distilled water and dextrose respectively. Isobaric solutions do not move under the influence of gravity in the CSF. Spread of solution and consequently height of block is not influenced by position of patient and is somewhat unpredictable. Hyperbaric solutions, being heavier than CSF, settle to the most dependent aspect of the subarachnoid space, which is determined by the position of the patient. In a supine patient, hyperbaric solutions gravitate to the thoracic kyphosis.

Hypobaric solution ‘floats’ up to the nerves innervating the surgical site. The major factors affecting height of subarachnoid block are the baricity of the local anaesthetic solution and the dosage (mass) of drug injected.

Fate of Local Anaesthetics in Subarachnoid Space

Following injection of local anaesthetic solution into subarachnoid space, its concentration falls rapidly. The initial steep fall is due to mixing with CSF and subsequent absorption into nerve roots and spinal cord. The regress of local anaesthetics following subarachnoid injection is primarily by vascular absorption with no hydrolysis or degradation taking place in the CSF. Depending on the type of the drug used, it is metabolized in plasma by pseudocholinestrease of in the liver. As duration of anaesthesia is in the part, a result of the rate of absorption from the subarachnoid space, the addition of a vasconstrictor to the local anaesthetic solution will retard absorption of the drug and thus increase the duration of anaesthesia.

Indications for Subarachnoid Block

Spinal anaesthesia can be administered whenever a surgical procedure can be done with a sensory level of anaesthesia that does not produce adverse patient outcome which includes,

- Lower abdominal surgeries
- lower limb surgeries

- urological procedures
- obstetric procedures
- gynaecological surgeries
- perineal & rectal surgeries

Contraindications for Subarachnoid Block

An absolute contraindication for subarachnoid block is patient refusal. Other contraindications are:

- local sepsis
- uncorrected coagulopathy
- uncontrolled blood loss/shock
- fixed cardiac output states
- documented allergy to local anaesthetics
- raised intracranial pressure
- neurological disease
- major spine deformities/previous surgery on the spine
- severe cardiac disease

SPINAL ANAESTHESIA — TECHNIQUE

The first step in the successful application of spinal anaesthesia is proper patient selection. This is accomplished by preanaesthetic evaluation of the patient through history, physical examination, laboratory data and

communication with the patient and surgical staff about detail of the communication with the patient and surgical staff about detail of the procedure. Suitable premedication is given to the patient before performing the subarachnoid block. Reliable intravenous access through a large bore intravenous cannula is mandatory. The administration of 500-1000 ml of [15-20ml/kg] of crystalloid to limit the hypotension that may result from the sympathetic block produced by spinal anaesthesia has some merit. The recommended standards for airway management and emergency drugs are kept in readiness. Spinal anaesthesia should be administered to a cooperative patient who is placed on a table that can be tripped upward or downward.

Procedure

The spinal anaesthetic technique can be broken down into a series of steps, the four 'P's; Preparation, Position, Projection and Puncture.

Preparation

Preparation of the equipment and drugs is essential for performing a subarachnoid block. The choice of drug is based on the duration of block desired, the surgical procedure and patient variables. Spinal needles of various diameters with various types of points are available. Spinal needles fall into two main categories; those that cut the dura and those designed to separate the dural fibers. The former includes the Quincke – Babcock needle and the latter include

the Greene, Whitacre and Sprotte needles. In order to keep the incidence of post dural puncture headache to a minimum, small bore needles with a rounded non-cutting bevel are preferred.

Position

The choice of position of the patient for performing the subarachnoid block depends on a number of factors, the proposed surgery being the most important. The three primary methods of positioning include lateral decubitus, sitting and prone positions; each with its own advantages in specific situations. In the lateral decubitus position, the patient is placed with his back parallel to the edge of the operating table nearest the anaesthesiologist, with thigh flexed upon the abdomen and neck flexed to allow the forehead to be as close to the knees as possible. The sitting position is chosen when low lumbar and sacral levels of anaesthesia are adequate for the surgical procedure, when obesity or scoliosis make identification of midline anatomy difficult in the lateral decubitus position or when orthopaedic problems of the hip and knee exist. The prone position is used primarily for the hypobaric technique for rectal and perineal procedures.

Projection and Puncture

The spinal puncture can be performed either by a midline or a paramedian approach, usually at the L2-L3. L3-L4 or L4-L5 interspaces. The

procedure is carried out under strict aseptic conditions. The patient's back is widely prepared with an antiseptic solution and sterile drapes applied. A line from the highest point of the iliac crest passes through either the spinous process of L4 or the L4-L5 interspace. The midline approach with patient in sitting position is used in our study. Depending on the interspace and approach selected, a subcutaneous skin wheal is raised over the intended puncture site with local anaesthetic solution. If an introducer is not used, the skin and soft tissue are fixed against the bony landmarks which straddle the interspace by the second and third fingers of the non-dominant hand of the anaesthesiologist. The needle is inserted in midline in the middle of the interspace with bevel parallel to the longitudinal dural fibers. After traversing the skin and subcutaneous tissue, the needle is advanced in a slightly cephalad direction with the long axis of the vertebral column. A characteristic change in resistance occurs as the needle traverses the supraspinous ligament, interspinous ligament, ligmentatum flavum, dura and pierces the arachnoid which becomes quite recognize as experience is gained. The stylet is removed and appearance of cerebrospinal fluid at the hub of the needle confirms the correct position of the needle tip. The hub of the needle is firmly hold between the thumb and index finger of the anaesthesiologist's non-dominant hand and the back of that hand placed against

patient's back to steady the needle, while syringe containing anaesthetic solution is firmly attached to the needle.

After confirming the flow of spinal fluid by aspiration, the anaesthetic solution is injected. The patient is placed in supine position. Cardiovascular and respiratory functions are monitored. Analgesia is checked by loss of sensation to pinprick.

COMPLICATIONS OF SUBRACHNOID BLOCK

Immediate

1. Hypotension
2. Bradycardia
3. Toxicity due to intravascular injection
4. Allergic reaction to local anaesthetic
5. Hypoventilation (brain stem hypoxia)

Late

1. Post dural puncture headache
2. Retention of urine
3. Backache
4. Meningitis
5. Transient lesions of cauda equine
6. Sixth nerve palsy

7. Anterior spinal artery syndrome

8. Horner's syndrome

PHARMACOLOGY OF BUPIVACAINE

Bupivacaine is an amide local anaesthetic, synthesized by A. F. Ekenstam in 1957 and brought into clinical use in 1963.

It is produced for clinical use in a racemic mixture, containing equal proportions of the 'S' and 'R' enantiomers. It is supplied for clinical use as a hydrochloride salt.

Chemical Structure

Description : ± 1 — Buty-N-(2, 6-dimethylphenyl)-2-piperidine Decarboxamide Hydrochloride monohydrate.

Physico-chemical Profile

Molecular Weight (base)	-	288
pKa	-	8.1
Solubility in Alchohol	-	1 in 8
Water	-	1 in 25
Octanol /Water partition coefficient	-	High
Lipid solubility	-	28
Plasma Protein Binding	-	95%

Mechanism of Action

Bupivacaine exerts its effect by inhibition of sodium channels. It acts to block conduction in the nerves by decreasing or preventing the large transient increases in permeability of the cell membrane to sodium ions that follows depolarization of the membrane. Bupivacaine also reduces the permeability of the resting nerve membrane to potassium as well as sodium ions.

Pharmacodynamics

Bupivacaine by virtue its pharmacological effects, has a stabilizing action on all excitable membranes. In the central nervous system, stimulation can occur producing restlessness, tremors and convulsions in overdosage. Bupivacaine also causes a reduction in the of automaticity of the heart.

The clinical profile of nerve blockade produced by Bupicavaine differs from that of lignocaine. It is 4 times more potent than lignocaine, but the onset of action is slower. The duration of action is considerably longer. The sensory block produced by Bupivacaine tends to be more marked than the motor block.

Pharmacokinetics

Bupivacaine is rapidly absorbed from the site of injection. The rate of rise in plasma Bupivacaine concentration and the peak plasma concentrations obtained depend on the route of administration. There is also some inter individual variation and peak systemic concentrations may occur between 5 and

30 minute after administration. The addition of vasoconstrictor delays absorption and results in lower plasma concentrations of Bupivacaine.

Pharmacokinetic Profile [14]

Volume of distribution at steady rate (Vdss)	72 litres
Clearance	0.47 L.min
t ½ α	2.7min
$t^{1/2}\beta$	28min
$t^{1/2}\gamma$	3.5hrs

Metabolism

Possible pathways for metabolism of Bupivacaine include aromatic hydroxylation, N-dealkylation, amide hydrolysis and conjugation. Only the N-dealkylated metabolic N-esmethylbupivacaine has been measured in blood and urine after epidural and spinal administration. The degradation of Bupivacaine takes place in the liver. Renal disease is unlikely to alter the kinetics of Bupivacaine to any great extent. Less than 10% of the drug is excreted unchanged in urine.

The onset of action of Bupivacaine occurs 20 — 30 minutes after a peripheral nerve block and duration lasts for 8-9 hours

Clinical Applications

• Infiltration anaesthesia

• Peripheral nerve blocks

• Central neruraxial blocks (intrathecal, epidural and caudal)

Contraindications

• Paracervical block (in obstetrics)

• Known hypersensitivity to amide local anesthetics

• Intravenous regional anaesthesia (IVRA)

Preparations Available

0.25%, 0.5% solutions in 10ml and 20ml vials.

5mg/ml (0.5%) Bupivacaine and 80mg dextrose in 4 ml ampoules for intrathecal injection (Baricity 1.0207)

Recommended Safe Dose

Concentration Used	**Maximum Permitted Dose**
0.125%-0.5%	3mg/kg body weight
0.75%(not to be used in obstertric epidurals)	Max.over 4 Hrs—150mg Max.during 24Hrs-400mg
0.5% plain / hyperbaric solution (intrathecal use)	20 mg.

Adverse Reactions

Adverse reactions are associated mainly with excess plasma levels of the drug, which may due to overdosage, unintentional intravascular injection or slow metabolic degradation.

CNS Reactions

Excitation characterized by restlessness, anxiety, dizziness, tinnitus blurred vision or tremors possibly proceeding to convulsions, followed by drowsiness, unconsciousness and cardiac arrest.

Cardiovasular System Effects

Part of the cardiac toxicity that occurs from high plasma concentrations of Bupivacaine occurs because of blockade of cardiac sodium channels. Accidental intravenous injection of Bupivacaine causes cardiac dysarrthymias, atrioventricular block, verticular tachycardia and ventricular fibrillation. Pregancy increases the sensitivity of cardiotoxic effects of Bupivacaine.

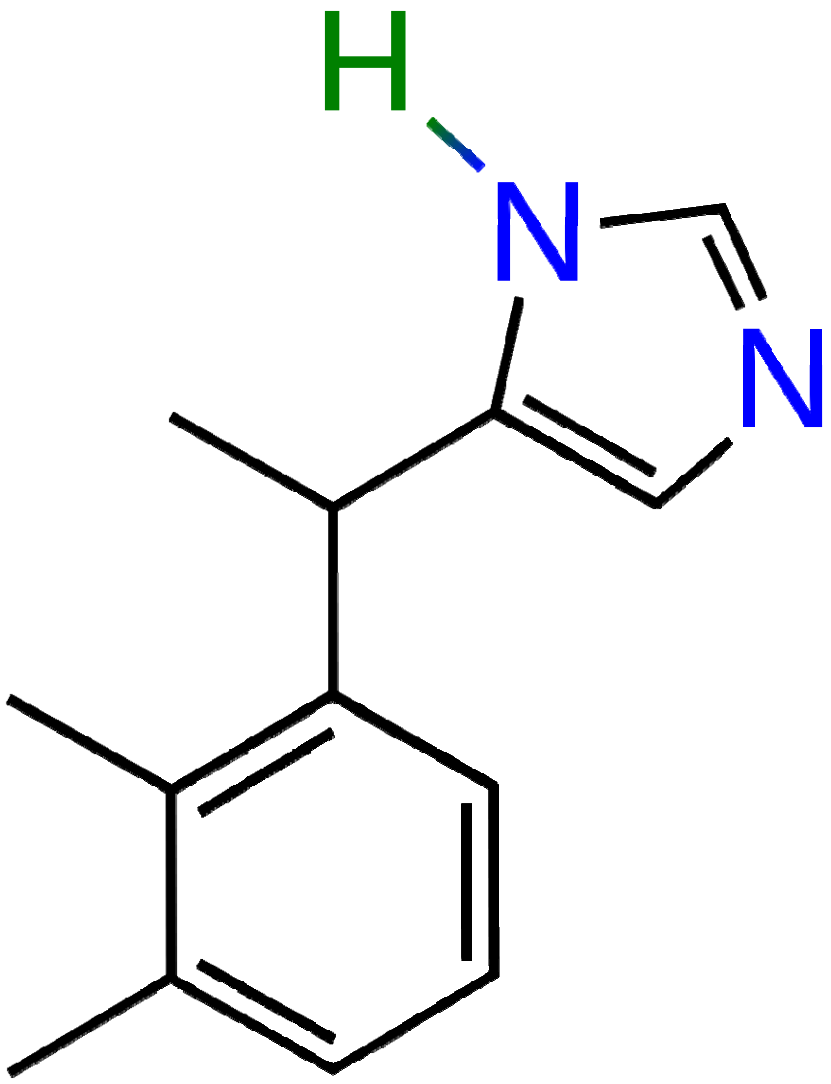
Allergic Reactions

Mainfests as urticaria, pruritus, angioneurotic edema etc. Cross sensitivity among members of amide type local anaethetics has been reported.

PHARMACOLOGY OF Dexmedetomidine

Dexmedetomidine is a highly selective α2 adrenergic agonist that produces sedation, hypnosis and analgesia.

STRUCTURE OF DEXMEDETOMIDINE



HISTORY:-

The initiation of the use α2 agonists in anaesthesia resulted from observations made in patients during anaesthesia who were receiving clonidine therapy. Dexmedetomidine was introduced in clinical practice in 1999. It was approved by FDA as a short-term [<24 hours] sedative for mechanically ventilated ICU patients.

CHEMISTRY:-

- 4[cs]-alpha,2,3-Trimethylbenzyl)imidazole
- Dexmedetomedine Hydrochloride is the s-enantiomer of medetomidine and is chemically described as:
- (+)-4-(s)-[1-(2,3-dimethylphenyl)ethyl]-1H-imidazolemonohydrochloride

Molecular formula : C13H16N2.Hcl

Molecular Weight : 236.74

PHARMACOLOGICAL PROFILE:

It is a highly selective α2 adrenergic agonist. It shows a high ratio of specificity for the α2 receptor [α2:d1, 1600:1] compared with clonidine [α2:d1 200:1] making it a complete α2 agonist. Dexmedetomidine belongs to the imidazole subclass of α2 agonists. Dexmedetomidine is the active s-enantiomer of meditomedine. It is highly water soluble and is available as a parenteral and preservative free formulation.

PHARMACOKINETICS:

Dexmedetomidine has a rapid distrubtion halflife-6 minutes. It is 94% protein bound and its concentration ratio whole blood and plasma is 0.66.

Metabolism:

Dexmedetomidine undergoes biotransformation by conjugation [41%], N-methylation [21%] or hydroxylation followed by conjugation in liver. The inactive metabolites excreted in urine and faces. The elimination half-life of Dexmedetomidine is 2 to 3 hours, with a context. Sensitive half time ranging from 4 mins after a 10 minute infusion to 250 minutes after an 8-hour infusion. Pharmacokinetics are similar in young adults and elderly.

Mechanism of Action:

Dexmedetomidine is a highly selective α2 agonist. There are 3 types of α2 adrenoreceptors in humans: α2A, α2B, d3C. The α2A adrenoreceptors are primarily distributed in the periphery where as α2B and α2C receptors are located in the Brain and Spinal cord.

Presynaptic activation of α2 adrenoreceptors inhibits the release of nor-epinephrine.

Post synaptic activation of α2-adrenoreceptors in the central nervous system inhibits sympathetic activity and decreases blood pressure and heart rate producing sedation and anxiolysis.

Analgesia is produced through binding of dexmedetomidine< to α2 adrenergic receptors in the spinal cord.

The overall response to α2 adrenoreceptor agonists is related to the stimulation of α2 adrenoreceptors located in the CNS and spinal cord.

Dexmedetomidine produces sedation and hypnosis by action on α2 receptors in the locus ceruleus and analgesic effect by acting at α2 receptors with in the locus ceruleus and with in the spinal cord.

ACTIONS:

Effects on the central nervous system**:**

SEDATION;

The α2 agonists through the endogenous sleep-promoting pathways to exert their sedative effect.

If produces unique sedative quality-yet arousable, alert and able to respond without becoming uncomfortable. Despite sound levels of sedation with Dexmedetomidine, there is limited respiratory depression. Providing wide safety margins.

ANALGESIA:

The analgesic effects of Dexmedetomidine are complex. They have an analgesic effects when injected through the intrathecal or epidural route. The primary site of action is thought to be the spinal cord.

Systemic use of Dexmedetomidine shows narcotic sparing narcotic requirements were reduced by 50% in patients receiving Dexmedetomidine. But the effects are inconsistent.

OTHER EFFECTS:

Dexmedetomidine in animal models of incomplete cerebral ischaemia and reperfusion reduces cerebral narcosis and improves cerebral outcome by reducing the intra cerebral catecholamine outflow and the reduction of the excitatory neurotransmitter glutamate during injury.

Dexmedetomidine also reduces muscle rigidity after high-dose opioid administration.

EFFECTS ON THE RESPIRATORY SYSTEM:

Dexmedetomidine of concentrations producing significant sedation reduces minute ventilation but retains hyper capnic ventilator response. The changes in ventilation appeared similar to those observed during natural sleep. Dexmedetomidine has been implicated in blocking histamine – induced broncho constriction in dogs.

EFFECTS ON THE CARDIOVASCULAR SYSTEM:

The basic effects of Dexmedetomidine on the cardiovascular system are decreased heart rate, decreased systemic vascular resistance and indirectly decreased myocardial contractility and systemic Blood pressure.

The effects of Dexmedetomidine on blood pressure shows a Biphasic response an initial increase in Blood pressure that occurred of 5 mins after administration [due to the vaso constrictive effects of Dexmedetomidine on peripheral α2 adrenoreceptors] followed by decreased in Blood pressure due to action on central α2 adrenoreceptor activity.

The incidence of Hypotension and Brady cardia may be related to the administration of loading dose omitting the loading dose or not giving more than 0.4μg/kg reduces the incidence of Hypotension. Giving the loading dose over 20 minutes also minimizes the transisent Hypertension.

DOSAGE AND ADMINISTRATION:

Dexmedetomidine is supplied in 2ml ampoule, 100μg-ml & 1ml ampoule 50μg/ml. Preservative free

- Loading dose – 0.5 – 1.0μg/kg over to minutes
- Maintenance dose – 0.3 – 0.7μg/kg/hr

USES:

Dexmedetomidine has been approved as a short-term sedative for adult intubated patients in ICU.

1. INTENSIVE CARE UNIT:

- Dexmedetomidine has following advantages for sedation in mechanically ventilated patients. Decreased requirement for opioids >50% when compared with propofol or Benzobiazepines.
- Providing adequate sedation with minimal respiratory depression. Can be used when weaning patients from ventilator.
- Dexmedetomidine has been used in the treatment of alcohol and drug withdrawal of narcotics, benzodiazepines, alcohol and recreational drugs.

2. Anaesthesia:

- Dexmedetomidine at doses of 0.3-0.67μg/kg given 10-15 minutes before induction attenuates the hemodynamic response to infubation.
- As a premedication 2.5μg/kg IM.
- Used for securing the airway during fibreoptic infubation.
- Sedation during regional Anaesthesia.
- As an anaesthetic adjuvant in Bariatric surgery, sleep apnea patients. Vascular surgery, CABG surgery, Craniotomy ancurysm, evoked potential study, thoracic surgery.

CONTRA INDICATIONS:

- Infusions over 24 hrs
- In caesarean deliveries, as the safety has not been studied

- Patients with preexisting Bradycardia and related Bradyarythmias.
- Patients with impaired ventricular function –Ef<30%]
- Hypovolemic or Hypotensive patients.
- Patients with raised intra cranial tension.

FENTANYL PHARMACOLOGY

Fentanyl

Fentanyl is a potent lipophilic synthetic opioid, μ receptor agonist with a short onset time and moderate duration of action. Fentanyl citrate is the synthetic parent opioid from which sufentanil and alentanil are derived.

Chemistry

Fentanyl citrate (sublimaze, durageric, duragesic)

$C_{22}H_{28}N_2OC_6H_8O_7$

N-phenyl-N-[1 (2-phenylethyl)-4piperidinyl] propanamide citrate

The phenylpiperidine (synthetic) opioid fentanyl skeleton structure.

Molecular weight (free base)	528.5(336.5)
pKa (amino)	8.43
Solubility	
in alcohol	1 in 140
in water	1 in 40
Octonol / water partition coefficient	955

Fentanyl is a μ agonist. It has a more rapid onset and shorter duration of action than morphine. The greater potency and more rapid onset of action reflect the greater lipid solubility of fentanyl compared with that of morphine.

Fentanyl produces dose related analgesia. Small doses of 0.5-3.0μgkg^{-1} may be used as a supplement in spontaneously breathing anaesthetized patients. Doses of 5.0μgkg^{-1} upward will suppress somatic and autonomic responses to surgical stimulation in ventilated patients.

Doses of 50μgkg^{-1} in conjunction with muscle relaxant and mechanical ventilation, may be used to induce and maintain anaesthesia.

Fentanyl is a potent respiratory depressant and reduces brain stem respiratory responsiveness to CO_2 and peripheral chemoreceptor input during hypoxemia.

Fentanyl exerts minimal effects on the circulation. There is a vagally mediated bradycardia and a slight all in systemic vascular resistance.

Skeletal muscle rigidity and clonic movements can hinder mechanical ventilation. This effect is reversed by naloxone and overcome by neuromuscular blocking drugs. Rigidity may also occur during emergence from anaesthesia.

High dose fentanyl obtunds the metabolic and hormonal response to surgery.

There is a reduction in metabolic activity following fentanyl and hence in oxygen consumption. Nausea and vomiting are the result of stimulation of the chemoreceptor trigger zone. Cough suppression, pupillary constriction and itching of the nose also occur.

Fentanyl has been found to significantly increase intracranial pressure in patients with severe head injury. Fentanyl also significantly decreases cerebral perfusion pressure.

Fentanyl may cause a rise in biliary intraluminal pressure.

Fentanyl will reduce intraocular pressure independent of changes in arterial blood pressure.

Relative contraindications for fentanyl are

1. Hypovolemia
2. Respiratory inadequacy
3. Raised ICP

Pharmacokinetics

A three-compartment model is typically used to describe plasma fentanyl concentration decay. The lungs exert a significant first pass effect and transiently take up approximately 75 percent o an injected dose of fentanyl.

As is typical of the fentanyl both volume of distribution (3-6Lkg^{-1}) and clearance (10-20 mlkg^{-1} min^{-1}) are high

Approximately 80% of fentanyl is bound to plasma proteins, and significant amount (40%) are taken up by red blood cells. As the pKa of fentanyl is high (8.4) at physiologic pH, it exists mostly in the ionized from (> 90%). Fentanyl's lipid solubility is also high, a finding that explains in part its large volume of distribution. The tissue/blood partition coefficient of fentanyl is found to be 2-30 fold higher than those of alfentanil. Because fentanyl is distributed so widely in the body, it must ultimately be returned to the blood to be metabolized in the liver. Fentanyl is relatively long acting, in large part because of its widespread distribution in body tissues.

Fentanyl is primarily metabolized in the liver by β-dealkylation and hydroxylation. Fentanyl has a high hepatic clearance (approaching hepatic blood flow) and a high hepatic extraction ratio (approaching 1.0). Metabolism begins to appear in the plasma as early as 1.5 min after injection. Norfentanyl, the primary metabolite, is detectable in the urine for upto 48 hours after IV fentanyl in humans. The activity of fentanyl's metabolites is unclear, but it is thought to be minimal. Little fentanyl is excreted in the urine unchanged.

Factors that alter pharmacokinetics and pharmacodynamics

- **Age:** The elimination of fentanyl in neonates is prolonged. With advanced age although pharmacokinetics changes may play a minor role,

- **Weight:** Fentanyl pharmacokinetics is not grossly different in lean versus obese subjects.
- **Renal failure:** For the fentanyl congeners the clinical importance of kidney failure is less marked.
- **Hepatic failure:** Reduction in liver blood flow that result from either liver disease or some other disorder will delay the decline of fentanyl plasma concentration.
- **Cardiopulmonary bypass:** Fentanyl pharmacokinetics is extensively altered by CPB.
- **Acid-base changes:** Acidosis increase ionized fentanyl in the interstitial space, draws unionized fentanyl out of the intracellular compartment, where a 13-fold accumulation of fentanyl occurs, further augmenting opioid effects, i.e. ventilatory depression.

Review of Literature

1. Subhi M. Al-Ghanem et al studied to evaluate the onset and duration of sensory and motor block as well as operative analgesia and adverse effects of DXM or fentanyl given intrathecally with plain. Bupivacaine for spinal anaesthesia. 78 patients were scheduled for vainal hysterectomy, vaginal wall repair and tension free vaginal tape were prospectively studied patients were randomly allocated to receive intrathecally either 10mg of isobaric bupivacaine plus 5µg of DXM [Group [n=38] or 10mg of isobaric bupivacaine plus 25µg of fentanyl [Group F n=38], the onset time reach peak sensory and motor level, the regression time for both sensory and motor Blockade, hemodynamic changes and side effects were recorded. Patients in Group-D had significant longer sensory and motor block times than patients in Group-F the mean time of sensory regression to s1 was 274±73 min in group D and 179±41 min group F [$p < 0.001$]. The regression time of motor block to reach modified Bromage 0 was 240±60 min in group D and 179±47 min in Group F [$p < 0.001$]. The results suggested that 10mg plain Bupivacaine with 5µg DXM produces prolonged motor and sensory block compared with 25µg Fentanyl.

2. Mahmoud M. Al-mustafa et al studied to determine the effect of adding DXM to Bupivacaine for neuraxial anaesthesia 66 patients were randomly

assigned in 3 groups each receiving spinal bupivacaine 12.5mg combined with Normal saline (Group N), DXM 5µg [Group D_5] & DXM 10mg [Group D_{10}]. The onset time to reach T_{10} sensory and Bromage 3 motor block and the regression times to reach S1 sensory level and Bromage 0 motor scale were recorded. The mean time of sensory Block to reach the T10 dermatome was 4.7+/-2.0 minutes in D10 group, 6.3+/-2.7 minutes in D5 and 9.5+/-3.0 minutes in group N. The mean time to reach Bromage 3 scale was 10.4+/-3.4 minutes in Group D10 13.0+/-3.4 minutes D5 and 18.0+/-3.3 min in Group N. The regression to Bromage 0 was 302.9+/-36.7 min in D10, 246.4+/-25.7 min in D5 and 140.1+/-32.3 minutes in Group N. The conclusion was dexmedetomidine has a dose dependent effect on the onset and regression of sensory and motor block when used as an adjuvant to Bupivacaine in spinal anaesthesia.

3. Kanazi et al studied to compare the onset and duration of sensory and motor block as well as the hemodynamic changes and level of sedation following intrathecal bupivacaine supplemented with either DXM or clonidine 60 patient received 12mg of 0.5% Bupivacaine [n=20], Group B, Group D received 12mg 0.5% Bupivacaine with 3µg of DXM and group C received 12mg of 0.5% Bupivacaine supplement with 30µg of clonidine. The onset times to reach peak sensory and motor levels and the sensory and motor regression times, were recorded. Hemodynamic changes and the level of sedation were recorded.

Patients in Groups D and C had a significantly shorter onset time of motor block and significantly longer sensory and motor regression times than patients in Group B. The mean time of sensory regression to the S1 segment was 303±75 min in Group D, 272±38 min in group C and 190±48 min in group B. The regression of motor block to Bromage 0 was 250±76 min in group D, 216±35 min in group C and 163±47 in group B [p valve < 0.001]. The onset and regression times were not significantly different between groups D and C. The mean arterial pressure, heart rate and level of sedation were similar in the three groups intra operatively and post-operatively. DXM (3μg) or clonidine (30μg), when added to intrathecal Bupivacaine, produces a similar prolongation in the duration of the motor and sensory block with preserved hemodynamic stability and lack of sedation.

4. Ibrahim. F.A. Khalifa et al studied the effect of adding intrathecal dexmedetomidineVs sufentanyl to heavy bupivacaine for post-op analgesia in patients undergoing inguinal hernia repair. 50 ASA Grade I/II patients, scheduled for elective inguinal hernia repair with 5μg of DXM and 5μg of sufentanyl with heavy bupivacaine 0.5% 2ml onset and duration of sensory and motor blockade, surgical condition and side effects were assessed. The duration of effective post-operative analgesia as assessed by VAS was not statistically significantly in between both groups. Cardio vascular and respiratory stability

was maintained with no significant incidence of side effects in either group. The addition of DXM 5μg and sufentanil 5μg intrathecally provide improved postoperative analgesia and hemodynamic stability Dexmedetomidine prolongs the post-op analgesia as sufentanil but with minimal side effects.

5. Antonio Mauro Vieira et al studied the analgesia and sedation promoted by clonidine or DXM associated to epidural ropivacaine, in the post-operative period to subcoastal cholecystectomy 40 pts of ASA I & II received clonidine 150μg to epidural ropivacaine 0.75% [20ml], DXM 2μg/kg^{-1} associated to epidural ropivacaine 0.75% 20ml. Analgesia and sedation were evaluated 216 and 24 hours anesthetic recovery. Both groups present some grade of sedation in the moments 2 and 6 hours, with statistically significant difference between the two moments for DXM group. There has bee analgesia in 6 and 24 hrs in the DXM group; in the clonidine group, this statistically significant difference was observed between the periods of 2 and 6 hours and between 2 and 24 hours. The conclusion was allowed to conclude that the association of clonidine or DXM to 0.75% ropivacaine induces analgesia and sedation in 2 and 6 hours after anesthetic recovery in patients submitted to subcostal cholecystectomy and that clonidine promotes more prolonged analgesia.

6. Saadway et al[4] studied the effect of DXM on the characteristics of Bupivacaine in a caudal block in pediatrics. 66 children undergoing unilateral inguinal hernia repair/orchidopexy were allocated randomly and Group B (n=33) received a caudal injection of Bupivacaine 2.5mg/ml, 1ml/kg; Group BD(n=33) received the same dose of Bupivacaine mixed with Dex 1μg/kg during sevoflurane anaesthesia. Processed EEG [BIS], heart rate, Blood pressure, pulse oximetry and end-tidal sevoflurane were recorded every 5 min. The characteristics of emergence, objective pain score, sedation score and quality of sleep were recorded post-operatively. Duration of analgesia and requirement for additional analgesics were noted. The results were the end-tidal sevoflurane concentration and the incidence of agitation were significantly lower in the BD group [$p < 0.05$]. The duration of analgesia was significantly longer ($p < 0.001$) and the total consumption of rescue analgesia was significantly lower in Group BD compared with Group B ($p < 0.01$). Group BD had better quality of sleep and a prolonged duration of sedation ($p < 0.05$) and the conclusion was caudal Dexmedetomidine seems to be a promising adjunct to provide excellent analgesia without side effects over a 24hr period. It has the advantage of keeping the patients calm for a prolonged time.

7. El. Hennawy Am et al studied the addition of clonidine or dexmedetomidine to Bupivacaine prolongs caudal analgesia in children. Undergoing lower

abdominal surgeries. 60 patients [6 months to 6 years] were evenly and randomly assigned into three groups in a double-blinded manner. After sevoflurane in oxygen anaesthesia, each patient received a single caudal dose of bupivacaine 0.25% [1ml kg (-1)] combined with either DXM 2μg/kg in normal saline 1ml, clonidine 2μg/kg in normal saline 1ml or corresponding volume of normal saline according to group assignment. Hemodynamic variables, end-tidal sevoflurane and emergence time were monitored. Postoperative analgesia, use of analgesics and side effects were assessed during the first 24 hr. The results were the addition of DXM or clonidine to caudal bupivacaine significantly promoted analgesia time [median [95% confidence internal c1]; 16 (14-18) and 12(3-21)h, respectively] than the use of sevoflurane and emergence time were monitored. Postoperative analgesia, use of analgesics and side effects were assessed during the first 24 hr. The results were the addition of DXM or clonidine to caudal bupivacaine significantly promoted analgesia time [median [95% confidence internal c1]; 16 (14-18) and 12(3-21)h, respectively] than the use of Bupivacaine alone [median (95%c1); 5 (4-6)h] with $p<0.001$. However, there was no statistically significant difference between dexmedetomidine and clonidine as regards the analgesia time ($p=0.796$). The conclusion was addition of DXM or clonidine to caudal bupivacaine significantly promoted analgesia in children undergoing lower abdominal surgeries with no significant advantage of

dexmedetomidine over clonidine and with out an increase in incidence of side effects.

8. Salgado PF et al studied to evaluate clinical characteristics of epidural anesthesia performed with 0.75% ropivacaine associated with dexmedetomidine. 48 patients scheduled for hernia repair or varicose vein surgeries under epidural anesthesia participated in this study. They were assigned to: control group (n=20), 0.75% ropivacaine, 20ml (150 mg); and dexmedetomidine Group (n=20) 0.75% ropivacaine 20ml (150 mg) plus DXM 1mg/kg^{-1}. The following variables were studied: total analgesic block onset time, upper level of analgesia, analgesic and motor block duration time, intensity of motor block, state of consciousness, hemodynamics post operative analgesia and incidence of side effects. The result was epidural dexmedetomidine did not affect the onset time or upper level of anesthesia ($p > 0.05$) however it prolonged sensory and motor block duration time ($p < 0.05$) and post operative analgesia ($p < 0.05$) and also resulted in a more intense motor block ($p < 0.05$). Values of Bispectral index were lower in DXM Group ($p < 0.05$). There was no difference in incidence of Hypotension and Bradycardia ($p > 0.05$). Occurence of side effects (shivering, vomiting and sp02 < 90%) was low and similar between groups ($p > 0.05$). The conclusion was there is a clear synergism between epidural DXM and ropivacaine.

9. Seewal R et al studied the effect of adding various doses of fentanyl to 2.2ml of Bupivacaine (0.5% Hyperbaric] for spinal anaesthestic in non-obstetric population undergoing superficial lower abdominal surgery. 60 patients received spinal anaesthetic with 2.2 ml of bupivacaine [0.5% Hyperbaric] and saline [control group], or Fentanyl 10, 20, 30 or 40 microgram. The volume of injected drug was kept constant at 3 ml by adding preservative free normal saline for blinding purposes. Subarachanoid block characteristics, drug-related side effects and post-operative analgesia requirements were assessed and recorded. Results showed a significant improvement in quality and duration of analgesia occurred in study groups compared with the control group $p < 0.05$. However no improvement in analgesia occurred when the dose of fentanyl added was increased from 10 to 20, 30, 40 microgram. Conclusion was study group significantly improves the quality and duration of analgesia. Seewal R – Effect of addition of various doses of fentanyl intrathecally to 0.5% Hyperbaric Bupivacaine on perioperative analgesia and subarachanoid block characteristics in lower abdominal surgery.

10. Bogra J, srivastara P et al studied the synergistic effect of intrathecal fentanyl and bupivacaine in spinal anaesthesia for caesaran section there by reducing the dose, & side effects, caused by higher doses of intrathecal bupivacaine in cesarean section. 120 patients divided in to 6 groups, identified

as B8, B10, B12.5, and 12.5mg of bupivacaine and FB8, FB10, FB 12.5 mg received a combination of 12.5μg intrathecal fentanyl respectively. The parameters taken into consideration were visceral pain, hemodynamic instability, intraoperative sedation, intraoperative and post-operative shivering and post operative pain. The results were the onset of sensory block E0 T6 occurred faster with increasing bupivacaine doses in bupivacaine only groups and bupivacaine – Fentanyl combination groups. Lower concentrations of bupivacaine alone could not completely removed the visceral pain. Blood pressure declined with the increasing concentration of Bupivacaine and Fentanyl. Incidence of nausea and shivering reduces significantly whereas, the post operative pain relief and hemodynamics increased by adding fentanyl. Conclusion was there is synergistic, potentiating effect of fentanyl on bupivacaine in spinal anesthesia for cesarian section is presented, Fentanyl is able to reduce the dose of bupivacaine and therefore is harmful effects.

11. Biswas B.N. et al. (2002) conducted a study on forty healthy women of ASA Gr I Scheduled for elective caesarean section. They were randomly allocated to receive 2 ml of 0.5% inj Bupivacaine (hyperbaric) with 0.25 ml of normal saline (Group A n = 20) or 0.25 ml (12.5 μg) fentanyl with (using a tuberculin syringe) (Group B n = 20) 2 ml of 0.5% inj Bupivacaine (hyperbaric).

Pulse rate, blood pressure, respiratory rate and foetalheart rate were recorded. Patients were prehydrated with 15 ml kg^{-1} Ringers lactate solution before spinal anaeshthesia. The onset and duration of sensory block was assessed by pinprick method. Time taken from intrathecal injection to the highest level of sensory block and sensory regression to the L_1 dermatome were recorded. The onset and duration of motor block was noted. Grading of motor block was done as per Bromage score. Pain was evaluated using a standard 10 cm linear visual analog scale (VAS). The duration of complete analgesia (Time from SAB to first report of pain) and time of effective analgesia (Time from subarachnoid injection to first doses of rescue analgesic) were recorded. Vital parameters and adverse effects, i.e. pruritus, nausea, vomiting, shivering were recorded. Every 2 minutes for first 20 minutes, then at 15 minutes interval for remainder of operation and thereafter at 30 minutes interval until patient complained of pain. APGAR scores were recorded at 1 and 5 minutes after delivery of baby. The highest sensory level achieved were T_7 (T_6-T_8) and T_5 (T_4-T_6) in group A and B respectively. In fentanyl group the time taken for sensory level to regress to S1 dermatome were prolonged but duration of motor blocks was not prolonged.

12. Sahar M Siddik Sayyid et al. (2002) conducted a study on 48 parturients scheduled for elective caesarean delivery. Patients were randomized double blinded. Patients were all classified as ASA physical status of I and II and had

no contraindication to spinal anaesthesia. The 48 subjects were allocated into two groups by using sealed envelope technique. The IT fentanyl group received 12 mg hyperbaric bupivacaine 0.75% and 12.5 µg of IT fentanyl (23 patients). The IV fentanyl group received 12 mg of hyperbaric bupivacaine 0.75% alone (25 patients), mix with CSF to achieve the same volume. In the OT room patient preloaded with 500 ml of polygeline (hemacel). LP was done in sitting posture. Immediately after intrathecal administration of drug, 12.5µg inj fentanyl IV given in the IV fentanyl group. Immediately after SAB patient was put in a supine position with 15°-20° left lateral tilt and 5L oxygen given via mask. Blood pressure, pulse rate and SPO_2 was measured every minute until delivery of the baby and at the 3 min interval until the end of the surgery. Whenever the systolic BP falls 20% below baseline 5 mg of IV ephedrine administered. Sensory block assessed by pinprick method every minute until block reached T_6 dermatome. There after every 2 min until the maximum sensory block level was confirmed.

MATERIALS AND METHODS

This study was conducted at the Kasturbai Gandhi memorial Government Hospital, Chennai-600 005 between June 2010 - August 2010 on 60 patients of ASA physical status I undergoing Elective adult surgical patient posted for vaginal wall repair & Vaginal Hysterectomy under subarachnoid block. This study was done after Government General Hospital Ethical committee approval and a written informed consent obtained from all the patients included in this study.

Study Design

This study was done in a prospective double blinded randomized manner. Each group consisted of thirty patients.

Group D

Patients in this group received 2.8 ml of 0.5% hyperbaric bupivacaine + 5μg [0.5 cc] of preservative free Dexmedetomidine to a total volume of 3.2 ml intrathecally.

Group F

Patients in this group received 2.8ml of 0.5% hyperbaric bupivacaine + 25µg [0.5 cc] of Fentanyl to a total volume of 3.2ml intrathecally.

The final volume of injected solution was 3.2ml in both groups.

In this study 0.5% hyperbaric bupivacaine in 8% dextrose, Dexmedetomidine hydrocholoride 50µg/0.5ml and preservative free fentanyl 50µ/1ml. All solutions were prepared by the OT incharge anaesthesiologist under strict aseptic precautions, uninvolved in the administration of SAB or in the observation of results.

Selection of Cases:

Inclusion criteria:

- Patients in the age group of 30 and above undergoing elective vaginal hysterectomy and vaginal wall repair.
- ASA physical status I
- Who have given valid informed consent

Exclusion criteria:

- Not statisfying inclusion criteria.
- Contra indication to SAB.
- Hypersensitivity to the study drug.
- Renal or Hepatic dysfunction
- Bleeding diasthesis
- Uncontrolled labile Hypertension & Diabetes mellitus.

PRE ANAESTHETIC EVALUATION

Patients included in this study underwent through preoperative evaluation which included the following

History

History of underlying medical illness, previous surgery and hospitalization.

Physical examination:

1. Vital signs
2. Height and Weight.
3. Examination of CVS, RS, CNS, Spine
4. Airway assessment.

Investigations:

Hb, BT, CT, RFT, Blood grouping & Typing, ECG, CXR, were done. Patient who satisfied the inclusion criteria were explained about the nature of the study and the anaesthetic procedure and written informed consent were obtained from all patients included in the study.

PRE LOADING:

In the premedication room pulse rate, BP, RR and sp02 was noted. An IV line was secured with 16G cannula. Preloading done with RL 500ml-1000ml] over 20-30 mts.

Technique

In the OT appropriate equipment for airway management and emergency drugs were kept ready. Patient was shifted from the premedication room to OT. The horizontal position of the operating table was checked and the patient was placed on it. NIBP, SP02, ECG leads were connected to the patient. Pre operative base line systolic and diastolic BP, PR, SP02 and RR were recorded. The anesthesiologist who were unaware of the drug combination performed the SAB and made observations in all the patients involved in the study. A midline lumbar puncture was performed using a 25G Quincke needle in Right lateral

position. Then patient was placed in supine position. The time of intrathecal injection was considered as 0 and following parameter were observed.

Sensory Block

Sensory block was assessed by loss of sensation to cold by cold alcohol swab along the mid clavicular line bilaterally, immediately after intrathecal injection and continued every 15sec till loss of cold sensation at T10 level till it reaches peak [T6 level]. The level of sensory block was noted at the end of the surgery and there after assessment was carried out at 15 mts interval till return of cold sensation at s1 dermatome, duration of sensory block was taken as the time from subarachanoid injection to return of cold sensation to s1.

Motor block

Motor block was assessed using modified BROMAGE Score

Bromage 0 – Patient is able to move the hip, knee and Ankle

Bromage 1 – Patient is unable to move the hip, but is able to move knee & ankle.

Bromage 2 – Patient is unable to move hip & knee but able to move ankle

Bromage 3 – Patient is unable to move hip, knee and ankle.

Assessment of motor block was started immediately after the intrathecal injection. It was tested every 15 seconds till peak motor block Bromage score was reached. The regression time for sensory and motor block were recorded in PACU.

Vital Signs and side effects

The systolic and diastolic BP, RR, PR & Sp02 were recorded every 1mt for 5mts and thereafter every 5mts throughout the intra operative period. The above vital signs at the completion of surgery were noted. Hypotension defined as fall in systolic BP > 30% from baseline or MAP < 60mm of Hg. This was managed with Inj. Ephedrine 6mg increments. Bradycardia was defined as heart rate <50/mt and this was managed with Inj. Atropine 0.01mg/kg iv. Respiratory depression defined as RR <8/mt and or Sp02 < 85%. This was planned to be managed with bag and mask ventilation or intubation and IPPV if necessary. Blood loss more than the allowable loss was replaced with blood. Vomiting was treated with Inj. Emeset 4mg iv. Pruritus was noted. Since this is a benign subjective symptom which is under reporting and usually need no treatment and need for any intra-op Analgesia was noted.

The occurrence of sedation were assessed using Ramsay sedation scale.

Level 1; Anxious and agitated or restless or both

Level 2; co-operative, oriented & calm

Level 3; Respond to commands only

Level 4; Exhibiting Brisk response to light glabellar tap or loud auditory stimulus

Level 5; Sluggish response

Level 6; No response.

Assessment of pain and duration of analgesia

Pain was assessed by verbal rating score

0-No pain.

1-mild pain.

2-Moderate pain.

3-Severe pain.

Quality of surgical anaesthesia:

Surgical ananesthesia was graded as excellent if there was no complaint of pain at any time during surgery. Good if there was minimal pain or discomfort which

was relieved by a small dose of iv pentazocine 0.5mg/kg and poor if GA has to be administered.

Assessment in PACU:

The patient was shifted to the PACU after completion of surgery. The vitals signs were recorded till the regression of both motor Block [Bromage 0] & the sensory block [s1].

PACU pain was assessed every 15 minutes. When the patient reaches the pain score 2 Inj. Diclofenac 75mg Im was given. Duration of effective analgesia was defined as the time interval between onset of SAB and the time to reach pain score-2.

Patient were shifted to post operative ward after complete resolution of motor blockade.

Statistical analysis

The descriptive statistics of the variables studied as represented as two-way tables. The categorical factors are represented by the number and Frequency [%] of cases. The continuous variable measures of central frequency [like median, mean, mode] and deviation [SD and range]. The difference in the proportion are tested for statistical significance using non parametric chi-square

test for variable measured on nominal scale. When testing for two factors the mann-whitney ‘v’ or Wilcoxon two sample test [by kruskal-Wallis ‘H’ test which is equivalent to chi-square] is used. For variables measured on a continous scale, one way analysis of variance is employed.

OBSERVATION AND RESULTS

This study was conducted at the kasturbai Gandhi Government Hospital Chennai, sixty (60) patients were included in this double blinded randomized controlled study. The patients were divided into two groups. Patients in Group F received 2.8ml [13 mg] of 0.5% Hyperbaric Bupivacaine plus 25µg [0.5cc] of Fentanyl and patients in Group D received 2.8ml [13mg] of 0.5% Hyberbaric Bupivacaine plus 5µg [0.5cc] of Dexmedetomidine (preservative free). Final volume of injected solution was 3.2cc in both groups.

STATISTICS

Demographic data: The two groups were comparable with respect to their age, height and weight. There was no statistically significant difference among two groups in demographic aspects [Table No:- 1, 2, 3]

TABLE No:-1 DISTRIBUTION OF MEAN AGE [YEAR] BY GROUPS

Parameters	**Group F**	**Group D**	**'P' Value**
No. of Cases	30	30	0.17
Mean	44.60	47.07	
S.D	6.981	6.736	

Table No:-2 DISTRIBUTION OF MEAN HEIGHT [cms] by groups

Parameters	Group F	Group D	'P' Value
No. of Cases	30	30	0.35
Mean	161.87	158	
S.D	6.447	4.5008	

Table No:-3 DISTRIBUTION OF MEAN WEIGHT [kgs] by groups

Parameters	Group F	Group D	'P' Value
No. of Cases	30	30	.66
MEAN	62.5	59.73	
S.D	7.386	6.18	

Diagnosis in both groups: Both groups were similar in respect of Diagnosis and ASA. [$p < 0.78$] which is not statistically significant. [Table No:- 5]

Type of surgeries in both groups:

Both groups were similar in types of surgeries and statistically no significant difference among two groups $p < 0.79$ [Table No:- 6]

Table No:-4 DISTRIBUTION OF MEAN DURATION OF SURGERY [in mins] by groups

Parameters	Group F	Group D	'P' Value
No. of Cases	30	30	0.268
MEAN	75.90	74.68	
S.D	12.221	11.98	

Table No:-5 DISTRIBUTION OF DIAGNOSIS

PARAMETERS	Group F	Group D	'P' Value
No. of Cases	30	30	0.78
OVP	13	11	
AUB	12	12	
FU	5	7	

Table No:-6 DISTRIBUTION OF PROCEEDURE IN BOTH GROUPS

PARAMETERS	Group F	Group D	'P' Value
No. of Cases	30	30	0.79
VH PFR	12	11	
VH	18	19	

ONSET OF SENSORY BLOCK T10 LEVEL

The time taken to achieve a sensory level of T10 from the time of SAB was tested by alcohol swab [loss of cold sensation]. The mean time taken in Group F was 2.83±0.53min and in Group D was 2.67±0.47 min. There was statistically no significant difference among two groups [p < 0.207] Table No:-7

Table No:-7 DISTRIBUTION OF MEAN ONSET OF SENSORY BLOCK [T10] IN MINS BY GROUPS

PARAMETERS	Group F	Group D	'P' Value
No. of Cases	30	30	0.207
MEAN	2.83	2.67	
S.D	.531	.479	

Table No:-8 DISTRIBUTION O MEAN ONSET OF SENSORY BLOCK [T6] IN MINS BY GROUPS

PARAMETERS	Group F	Group D	'P' Value
No. of Cases	30	30	0.207
MEAN	4.80	4.77	
S.D	0.761	0.679	

To reach Sensory block T6 level

The time taken to achieve a peak sensory level of T6 from the time of SAB was tested by alcohol swab. The mean time taken in Group F was 4.80 ± 0.76 min and in Group D was 4.77 ± 0.68 min. There was no statistically significant difference among two groups $p < 0.207$ [Table No:-8]

Time to reach Bromage 3 motor block

The time taken to achieve Bromage 3 from the time of SAB was tested by modified Bromage scale. The mean time taken in Group F was 6.63 ± 0.69 min. There was statistically no significant difference among two groups $p < 0.623$ [Table No:-9]

Table No:-9 DISTRIBUTION OF MEAN TIME TO REACH MOTOR BLOCK [Bromage 3] min by groups

PARAMETERS	**Group F**	**Group D**	**'P' Value**
No. of Cases	30	30	0.623
MEAN	6.63	6.53	
S.D	0.556	0.681	

Duration of Sensory block

The mean time taken for return of cold sensation to S1 level was 358.97±46.73 min in Group F and in Group D was 459.03 ±56.9 mins. There was statistically significant difference among two groups in the duration of sensory block $p < 0.000$ Table No:-10

Table No:-10 DISTRIBUTION OF MEAN TIME FOR REGRESSION OF SENSORY BLOCK [S1] IN MINS by groups

PARAMETERS	Group F	Group D	'P' Value
No. of Cases	30	30	0.000**
MEAN	358.97	459.03	
S.D	46.737	56.927	

Table No:-11 DISTRIBUTION OF MEAN TIME FOR REGRESSION OF MOTOR BLOCKADE [BROMAGE 0] IN MINS by groups

PARAMETERS	Group F	Group D	'P' Value
No. of Cases	30	30	0.000**
MEAN	231.83	288.63	
S.D	39.958	31.127	

Duration of motor block

The mean duration of return of motor block to Bromage scale zero [0] was 231.83±39.96 min in Group F and in Group D was 288.63±31.13 mins. There was statistically significant difference among two groups in the mean duration of motor block $p < 0.000$ [Table No:-11]

Duration of time for Rescue analgesia

The mean time for demand analgesia [defined as the time at which patient demands some mode of pain relief] was 212.67±38.97 mins in Group F and in Group D was 276.73±49.32 mins. There was statistically significant difference among two groups in the duration of time for demand analgesia $p < 0.000$ [Table No:-12]

No:-12 DISTRIBUTION OF MEAN TIME FOR RESCUE ANALGESIA IN MINS BY GROUPS

PARAMETERS	**Group F**	**Group D**	**'P' Value**
No. of Cases	30	30	.000**
MEAN	212.67	276.73	
S.D	38.976	49.321	

Maximum grade of motor block

The maximum degree of motor block in both groups was Grade 3. There was no statistically significant difference among two groups in the maximum Grade of motor block p < 1 Table No:-13

Table No:-13 MAXIMUM GRADE OF MOTOR BLOCK by groups

PARAMETERS	**Group F**		**Group D**		**'P' Value**
	No	%	No	%	1
No. of Cases	30		30		
Grade 3	30	100%	30	100%	
Grade 2	0	0	0	0	

Table No:-14 MAXIMUM LEVEL OF SENSORY BLOCK by [T4-T6] groups

PARAMETERS	**Group F**		**Group D**		**'P' Value**
	No	%	No	%	0.086
No. of Cases	30		30		
T4	4	13.3%	3	10.%	
T6	26	86.6%	27	90.%	

Maximum level of Sensory Block [T4-T6]:-

The range of maximum level of sensory block was T4-T6 in both groups. The median of the onset of sensory block was T6 in both groups. T4 was 13.3% in Group F and 10% in Group D. T6 was 86.6% in Group F and 90% in Group D which was statistically not significant < 1 Table No:-14

Quality of surgical Anaesthesia

Quality of surgical anaesthesia was excellent in all patients. There was no statistically significant difference among two groups p < 1 [Table No:15]

Table No:-15 DISTRIBUTION OF CASES BY GROUPS AND QUALITY OF SURGICAL ANAESTHESIA

PARAMETERS	**Group F**		**Group D**		**'P' Value**
	No	%	No	%	1
No. of Cases	30		30		
Excellent	30	100%	30	100%	
Good	0	0	0	0	

Side effects and complications

The incidence of Hypotension in Group F was 30% and in Group D was 10% which was significant statistically $p < 0.05$ [Table No:-16]

Table No:-16 DISTRIBUTION OF CASES by Hypotension in Both groups

PARAMETERS	**Group F**		**Group D**		**'P' Value**
	No	%	No	%	
No. of Cases	30		30		0.83
Hypotension	9	30%	6	20%	

Table No:-17 DISTRIBUTION OF CASES by Groups and side effects

Side effects	**Group F**		**Group D**		**'P' Value**
	No	%	No	%	0.301
BRADYCARDIA	1/30	3.33%	3/30	10%	0.002**
PRURITIUS	8/30	26.66%	0	0%	
Vomiting	2	6.66%	1	3.33%	0.554
INTRA OP ANALGESIA	0	0%	0	0%	1

The incidence of Bradycardia in Group F was 3.33% and in group D was 10% and there was statistically no significant difference in both groups $p < 0.30$ Table No:-17

The incidence of pruritus in Group F was 26.66% and in Group D no case of pruritus was observed $p < 0.002$ Table No:-17.

The incidence of vomiting in Group F 6.66% & Group D 3.33% which was statistically not significant $p < 0.55$ Table No:-17

The incidence of sedation score 2 was 100% in both the groups was statistically not significant $p<1$ Table No:-18

Table No:-18 DISTRIBUTION OF CASES by sedation score

PARAMETERS	**Group F**		**Group D**		**P Value**
SEDATION SCORE 2	No	%	No	%	1
	30/30	100%	30/30	100%	
SEDATION SCORE 3	0	0	0	0	
SEDATION SCORE 1	0	0	0	0	

DISCUSSION

Subarachnoid Block is a commonly used anaesthetic technique for lower abdominal surgeries. There has been a growing interest in the use of analgesic additives to spinal local anaesthetics Alpha2 agonist like Dexmedetomidine have been shown to prolong the duration of both sensory and motor blockade and to provide extended postop analgesia.

In this study 5µg of Dexmedetomidine was added to 13mg [2.8ml] of 0.5% Hyperbaric Bupivacaine or 25µg of fentanyl added to 13mg [2.8ml] of 0.5% Hyperbaric Bupivacaine and its efficacy as an adjuvant to subarachanoid Bupivacaine was studied in 60 patients undergoing elective Vaginal Hysterectomy and tension wall repair surgeries.

ONSET OF SENSORY BLOCK

The mean time to onset of sensory Block (T10 level) was 2.83 ± 0.53 mins in Group F and 2.67 ± 0.48 mins in Group D. In our study the addition of 5µg of Dexmedetomedine to Hyperbaric Bupivacaine did not shorten the onset of sensory block [T10 level] when compared to the addition of 25µg of fentanyl to Hyperbaric Bupivacaine. The onset of sensory block [T10 level] was similar in both groups.

This correlated with the study subhi M Al-Ghanem et al. who compared the effect of 5µg Dexmedetomidine Vs fentanyl 25µg in intra operative analgesia and the duration of sensory & motor block when added to 10mg intrathecal plain Bupivacaine and observed that there is no statistically significant difference between the two groups as regards to the onset time of sensory block at T10 level.

Ibrahim F.a. Khalifa et al did a comparative study of adding intrathecal 5µg Dexmedetomedine and 5µg of sufentanyl to 10mg of heavy Bupivacaine found that there is no statistically significant difference in the onset of sensory block T10 level Group D = 5.5±3.7, where Group 57 = 6.2±1.3 $p < 0.69$.

Maximum level of sensory Block

The median of the upper limit block was T6 in Group D and Group F. There was no statistically significant difference among the two groups in the maximum level of sensory Block. The addition of Dexmedetomidine to hyperbaric Bupivacaine did not increase the speed of sensory level when compared with 25µg of fentanyl to hyperbaric Bupivacaine.

- Kanazi et al found that there is statistically no significant difference for the maximal sensory Block for 12mg Bupivacaine 0.5% alone or combined 3µg of Dexmedetomidine or 30µg of clonidine [p = 0.3].
- Mahmoud M. Al Mustafa et al found that addition of intrathecal Dexmedetomidine in increasing doses 5µg, 10mg of Dexmedetomidine with 12.5mg of Spinal Bupivacaine increased the level of sensory block as the dose of Dexmedetomidine increases.
- Ibrahim F.A. Khalifa et al found that there is statistically no significant difference for the maximal sensory block when compared with 5µg of Dexmedetomedine and 5µg of sufentanyl to 10mg of heavy Bupivacaine

Time to reach peak sensory Block (T6 level]

The mean time to reach T6 level was 4.80 ± 0.76 mins in Group F and 4.77 ± 0.68 mins in Group D. There is no statistically significant difference among the two groups.

This correlated with the study subhi M. Al Ghanem et al who found that addition of 5µg of Dexmedetomidine and 25µg of fentanyl with 10mg of isobaric Bupivacaine intrathecally had no significant difference on the mean time to reach peak sensory level 19.34 ± 2.87 in Group D and 18.39 ± 2.46 in Group F p = 0.12.

Onset of Motor Block

The mean time to achieve Bromage 3 score was 6.63 ± 0.56 mins an Group F and 6.53 ± 0.68 mins in Group D. The addition of 25µg fentanyl or 5µg Dexmedetomidine to 13mg of Bupivacaine have no effect on the onset of motor block.

This Correlated with the Study of

Ibrahim F. A. Khalifa et al found that there is statistically no significant difference with 5µg of Dexmedetomidine and 5µg of sufentanyl to 10mg of heavy Bupivacaine on the mean time to achieve bromage 3 score.

Duration of Sensory Block

In our study the duration of sensory block was 358.97 ± 46.74 mins in Group F and 459.03 ± 56.93 mins. The addition of 5µg of Dexmedetomidine to Hyperbaric Bupivacaine significantly prolonged the duration of sensory block. [Intrathecal Dexmedetomidine when combined with spinal Bupivacaine prolongs the sensory block by depressing the release of c-fibres transmitters and by hyperolarization of post-synaptic dorsal horn neurons].

This correlated with the study

- Subhi M. Al-Ghanem et al found that the addition of 5µg of Dexmedetomidine to 10mg of isobaric Bupivacaine 274.83 ± 73.4 significantly prolong the duration of sensory blockade while 25µg of fentanyl to 10mg of isobaric Bupivacaine was 179.5±47.4. There was statistically significant difference among the two groups $p < 0.00$ [Intrathecal Dexmedetomidine when combined with spinal Bupivacaine prolongs the sensory block by depressing the release of c-fibers transmitters and by hyperpolarization of post-synaptic dorsal horn neurons].
- Kanazi et al found that the addition of 3µg of Dexmedetomidine to 12mg of intrathecal Bupivacaine or 30µg of clonidine significantly prolonged the sensory block.
- Al Mustafa MM et al studied that there is a significant difference in the duration of sensory block among three groups who received spinal Bupivacaine 12.5mg alone or combined with 5µg of Dexmedetomidine or with 10µg of Dexmedetomidine. He concluded that Dexmedetomidine has a dose dependent effect on the onset and regression of sensory and motor block when used in SAB.

DURATION OF MOTOR BLOCK

In our study the mean duration of motor block was 231.83 ± 39.96 mins in Group F and 288.63 ± 31.13 mins in Group D. The addition of 5µg of Dexmedetomidine to 0.5% Bupivacaine significantly prolonged the duration of motor block.

- Subi M. Al-Ghanem et al found in their study that 5µg of Dexmedetomidine to 0.5% hyperbaric Bupivacaine prolonged effect of motor blockade that 25µg of fentanyl to 0.5% hyperbaric Bupivacaine intrathecally.
- Kanazi et al observed that addition of 12mg of Bupivacaine supplemented with dexmedetomidine and 12mg of Bupivacaine with 30µg of clonidine intrathecally produces similar prolongation in the duration of motor block when compared 12mg of Bupivacaine alone. [The prolongation of motor block produced by subarachnoid Hyperbaric Bupivacaine combined with 5µg of Dexmedetomidine results from binding these agonist to motor neurons in the dorsal horn of the spinal cord].
- Mahmoud M. Al Mustafa et al found that Dexmedetomidine has a dose dependent effect on the duration of motor blockade when added to

- Ibrahim F.A Khalifa et al found that the addition of 5µg of Dexmedetomidine to 2ml of heavy Bupivacaine and 5µg of sufentanyl to 2ml of heavy bupieracaine produces a significant difference in the duration of motor blockade.

Quality of Surgical anaesthesia

The quality of surgical anaesthesia was excellent in both groups.

Though studies have shown

- Ibrahim F.A. Khalifa et al found that the quality of surgical anaesthesia was better in patients received 5µg sufentanyl to 2ml of heavy Bupivacaine when compared to 5µg of Dexmedetomidine to 2ml of heavy Bupivacaine

DURATION OF ANALGESIA

In our study the mean time for Rescue analgesia is 212.67 ± 38.98 mins in Group F and 276.73 ± 49.321 [$p < 0.000$] which was statistically significant difference in the duration of Analgesia by two groups

Though studies have shown

Ibrahim F.A. Khalifa et al found that the addition of 5µg of Dexmedetomidine to 10mg of Hyperbaric Bupivacaine and 5µg of sufentanyl to 10mg of Hyperbaric Bupivacaine intrathecally produces no significant difference in the duration of pain relief Group SF = 265.8 ± 112.3, Group D = 240. 2±77.3 mins [p < 08].

Complications

In our study the incidence of Hypotension was 30% in Group F and 20% in Group D. Hypotension was mild to moderate in both groups which was not statistically significant different p < 0.083. The most significant side effects reported about the use of intrathecal α2 adrenoreceptor agonists are Bradycardia and hypotension. But in present study these side effects were not significant because small dose of intrathecal Dexmedetomidine was used.

This correlated with the study

- Kanazi et al studied that the addition of Dexmedetomidine or clonidine to Bupivacaine did not cause a significant decrease in the Blood pressure intraoperatively or postoperatively. Intrathecal local anaesthetics block the sympathetic outflow and reduce the blood pressure. The sympathetic

block is usually near-maximal with the doses used for spinal anaesthesia. The addition of a low dose of α2 agonist to a high dose of local anaesthetics does not further affect the near maximal sympatholysis.

- Ibrahim F.A. Khalifa et al found that the addition of 5µg of Dexmedetomidine to spinal Bupivacaine and 5µg of sufentanyl to spinal Bupivacaine did not produce a significant difference in the incidence of hypotension.
- Subi M. Al-Ghanem found that hypotension was more in fentanyl group than in the Dexmedetomidine group but it did not reach a significant difference. Mean while, hypotension occurred 25-30 minutes after spinal injection in 2 patients in the Dexmedetomidine group and one patient in fentanyl group had mild episodes of Hypotension in PACU.

The incidence of brady cardia was 10% in Group D and 3.33% in Group F [$p < 0.301$]. There is no statistically significant difference among two groups

- Ibrahim F.A. Khalifa et al found that there is statistically no significantly difference in the incidence of Bradycardia in both the groups with 5µg of sufentanyl to 10mg of 0.5% Bupivacaine and 5µg of Dexmedetomidine to 10mg of 0.5% Bupivacaine.

- Subi-M-Al-Ghanem et al found that there is statistically no significant difference in the incidence of Brady cardia among two groups of 5µg of Dexmedetomidine to 10mg of isobaric Bupivacaine and 25µg of fentanyl to 10mg of isobaric Bupivacaine intrathecally.

The incidence of pruritus was 26.67% in Group F and 0% in Group D. There is statistically significant difference among two groups.

This correlates with the study

- Ibrahim F.A. Khalifa et al found that there is significant difference in the incidence of pruritus in the sufentanyl group.
- Subi M. Al. Ghanem found that there is statistically significant difference in the incidence of pruritus. Pruritus after intrathecal fentanyl is reported to be 40-70% but if was only 13% in present study which can be explained by the fact that pruritus is a benign subjective symptom which is under reporting and usually needs to treatment
- Bogra J. Srivastara P et al found there is statistically significant difference in the incidence of pruritus with 10mg of fentanyl, 12.5mg of fentanyl, added to hyperbaric Bupivacaine.

The incidence of vomiting, sedation, was not statistically significant in both the groups.

This correlated with the study

- Kanazi et al found that intrathecally administrated α2 agonist have a dose-dependent sedative effect (36,37). The doses of clonidine and dexmedotomedine selected in their study were at the lower end of the dosing spectrum. This explains the lack of sedative effects between the study groups B and C and the intraoperative anxiety one patient in Group D.

SUMMARY

This double blinded prospective randomized controlled trial was designed to evaluate the onset and duration of sensory and motor block as well as operative analgesia and adverse effects of Dexmedetomidine vs fentanyl given intrathecally with heavy 0.5% Bupivacaine for spinal anaesthesia in patients scheduled for vaginal hysterectomy, vaginal wall repair patients receiving 25µg of fentanyl with 2.8cc of Bupivacaine intrathecally served as the control.

The Following observations were made:

- The addition of Dexmedetomidine significantly prolonged the duration of sensory and motor block.
- The addition of Dexmedetomidine significantly prolonged the time for demand analgesia.
- The addition of Dexmedetomidine intrathecally had no effect on the onset of sensory or motor block when compared with fentanyl.
- The incidence of side effects was limited to the occurence of Hypotension, Bradycardia vomiting in the groups that received Dexmedetomidine intrathecally.

- The incidence of pruritus were more in the groups that received fentanyl intrathecally.
- The addition of Dexmedetomidine intrathecally had similar effect on sedation when compared to fentanyl.

Conclusion

Intrahtecal Dexmedetomidine supplementation of spinal block seems to be a good alternative to intrathecal fentanyl since it produces prolonged sensory block and motor block. It is evident that this type of block may be more suitable for lower abdomen and lower extremities surgeries.

A drawback of Dexmedetomidine supplemented spinal block characteristics is the increase in the duration of motor block which may not suit short term surgical procedures or ambulatory surgery.

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PATIENT CONSENT FORM

STUDY TITLE:

Effect of adding Dexmedetomidine vs Fentanyl to intrathecal Bupivacaine on spinal block characteristics in Gynecological procedures: double blinded control study

STUDY CENTRE:

Department of Anaesthesiology, Govt Kasturba Gandhi Hospital for Women & Children, Triplicane, Chennai-600005

PARTICIPANT NAME: **AGE:** **SEX:** **I.D.NO:**

I confirm that I have understood the purpose of procedure for the above study. I have the opportunity to ask the question & all my questions & doubts have been answered to my satisfaction.

I have been explained about the possible complications that may occur during the procedure. I understand that my participation in the study is voluntary & that I am free to withdraw at any time without giving any reason.

I understand that investigator, regulatory authorities & the ethics committee will not need my permission to look at my health records both in respect to the current study & any further research that may be conducted in relation to it, even if I withdraw from the study. I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from the study.

I hereby consent to participate in this study" Effect of adding Dexmedetomidine vs Fentanyl to intrathecal Bupivacaine on spinal block characteristics in Gynecological procedures: double blinded control study"

Time: **signature / thumb impression of patient**

Date: **Patient name:** _____

Place:

Signature of the investigator: _____

Name of the investigator: _____

PROFORMA

Name: Age: IP No: Date:

Diagnosis: Procedure:

Preop assessment:

H/O Medical illness:

H/O Previous surgery:

GENERAL EXAMINATION

Height: Weight:

PR: BP: RR:

CVS: RS: CNS:

SPINE:

AIRWAY:

INVESTIGATIONS

Hb: BT: CT: BLOOD GROUPING & TYPING

BLOOD SUGAR: UREA: CREATININE:

ECG: CXR:

ASA

Preloading	

SAB:

Space	Needle	Size	Approach	Position	Drug

SENSORY BLOCK :

Time to reach sensory block — T10 level [in mins]

Time to reach peak sensory block :

level	
time	

Time to regress to S1 dermatomal level [in mins]

MOTOR BLOCK : MODIFIED BROMAGE SCALE

Time to reach motor block [Bromage 3]

Time to regress [Bromage 0] :

Bromage 0 – able to move hip, knee and ankle

Bromage 1 – able to move knee and ankle

Bromage 2 – able to move ankle only

Bromage 3 – unable to move

TIME	PR	SBP	DBP	MAP	SpO2	RR	SIDE EFFECTS	RSS
BASE LINE								
5 min								
10 min								
15 min								
20 min								
25 min								
30 min								
35 min								
40 min								
45 min								
50 min								
55 min								
60 min								
65 min								
70 min								
75 min								
80 min								
85 min								
90 min								
95 min								
100 min								

Duration of surgery [in mins]:

Side effects :

Side effects	Group
Nausea/vomiting	
Puritus	
Hypotension	
Bradycardia	
Need for intraop analgesia	

Intraop events :

IV fluids :

Inj. Ephedrine [6 mg IV bolus] :

Inj. Atropine [0.6 mg IV bolus] :

Conversion to GA :

QUALITY OF SURGICAL ANAESTHESIA :

Excellent	Good	Poor

POST OP MONITORING :

Parameters	15 mins	30 mins	45 mins	60 mins	75 mins	90 mins	105 mins	120 mins	135 mins	150 mins	165 mins	180 mins	210 mins	240 mins	300 mins	360 mins	420 mins	480 mins	540 mins	600 mins
HR																				
BP																				
PAIN SCORE																				
RSS																				
ADVERSE EFFECTS																				
LEVEL OF SENSORY BLOCK																				
LEVEL OF MOTOR BLOCK																				

Pain score : [Verbal Rating Scale]

0 – no pain

1 – mild pain

2 – moderate pain

3 – severe pain

RAMSEY SEDATION SCORE :

1 – anxious and agitated or restless or both

2 – co-operative, oriented and calm

3 – responsive to commands only

4 – exhibiting brisk response to light glabellar tap or loud auditory stimulus

5 - exhibiting sluggish response to light glabellar tap or loud auditory stimulus

6 – unresponsive

POSTOP ANALGESIC CONSUPTION :

Time of first rescue analgesic :

INSTITUTIONAL ETHICAL COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI -3
Telephone No: 04425305301
Fax : 044 25363970

CERTIFICATE OF APPROVAL

To
Dr. Devikala Loganathan
PG in MD Anaesthesia
Dept . of Anaesthesia
SMadras Medical College, Chennai -3.

Dear Devikala Loganathan

The Institutional Ethical Committee of Madras Medical College reviewed and discussed your application for approval of the project / proposal / clinical trail entitled " Effect of adding Dexmedetomidine vs fentanyl to intrathecal bupivacaine on spinal block characteristics in Gynecological procedures: double blinded control study:" No 27082010.

The following members of Ethical committee were present in the meeting held on 17.08.2010 conducted at Madras Medical College, Chennai -3

1.	Prof. S.K. Rajan, MD	– Chairperson
2.	Prof. J. Mohanasundaram, MD,Ph.D,DNB Dean, Madras Medical College, Chennai -3	– Deputy Chairman
3.	Prof. A. Sundaram, MD Vice Principal , MMC, Chennai -3	– Member Secretary
4.	Prof R. Nandhini, MD Director, Institute of Pharmacology, MMC, Ch-3	– Member
5.	Prof. Pregna B. Dolia , MD Director, Institute of Biochemistry, MMC, Ch-3	– Member
6.	Prof. C. Rajendran , MD Director, Institute of Internal Medicine, MMC, Ch-3	– Member – Member
7.	Prof. V. Shruti Kamal, MS Professor of Surgery, MMC, Ch-3	– Member
8.	Mrs. Arnold Saulilna, Social Scientist	-- Member

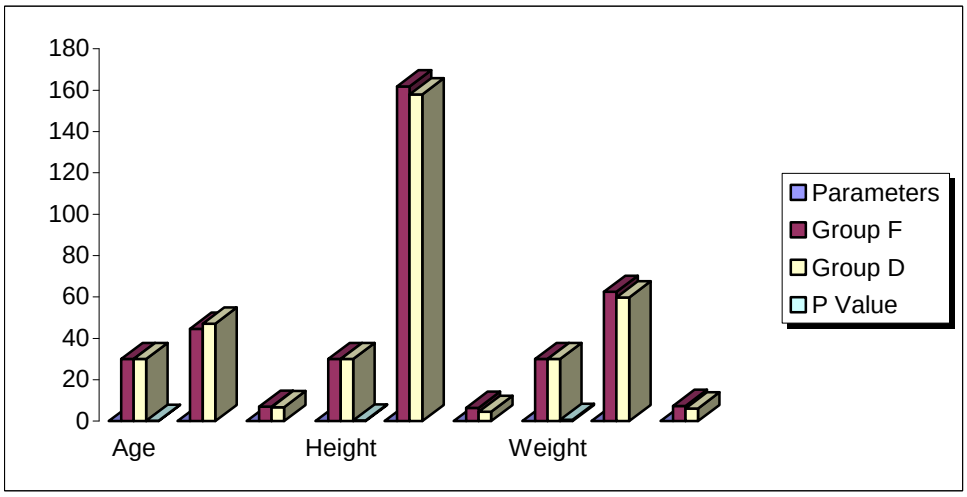
We approve the trail to be conducted in its presented form.

Sd /. Chairman & Other Members

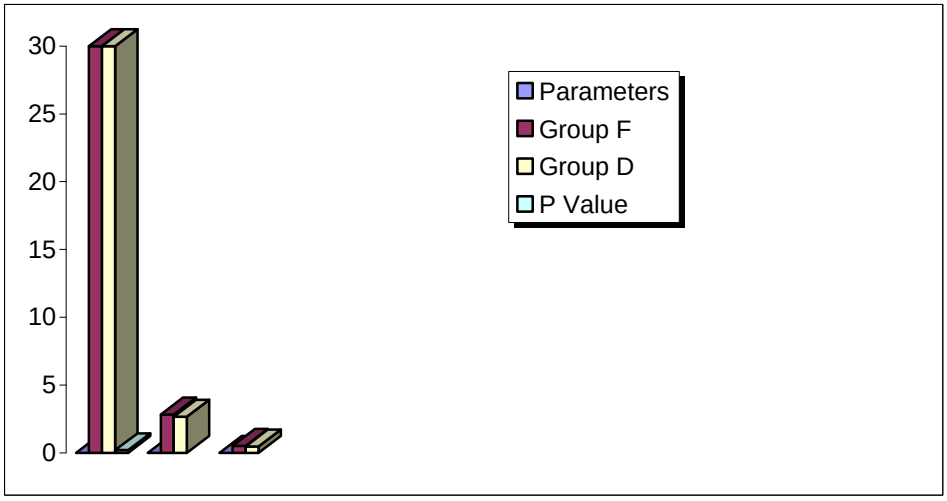
The Institutional Ethics Committee expects to be informed about the progress of the study, any SAE occurring in the course of the study, any changes in the protocol and patient information / informed consent and asks to be provided a copy of the final report

Member Secretary, Ethics Committee

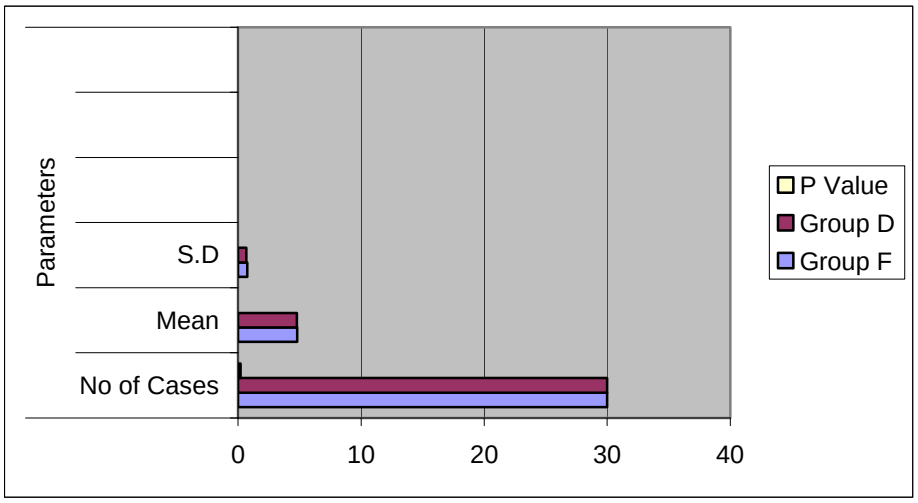
Distribution of Mean Age, Height & Weight by Groups



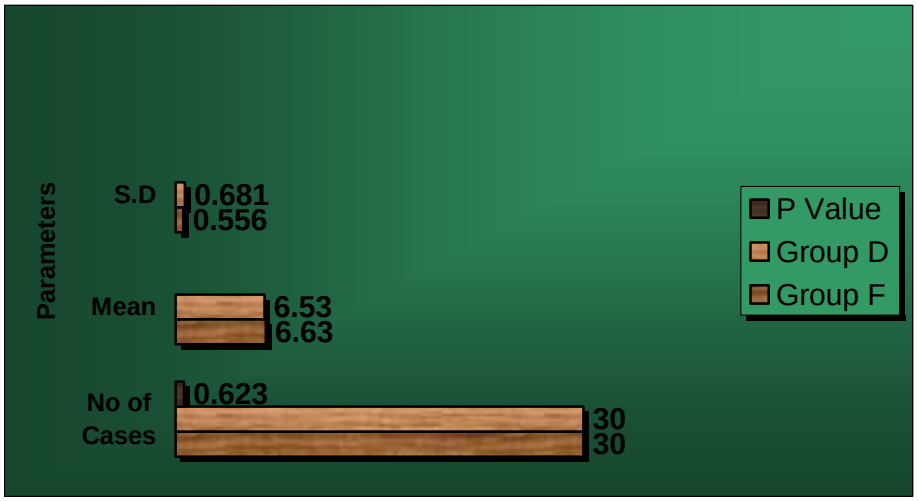
Distribution of Mean ONSET of Sensory Blocks T10 in Mins by Groups



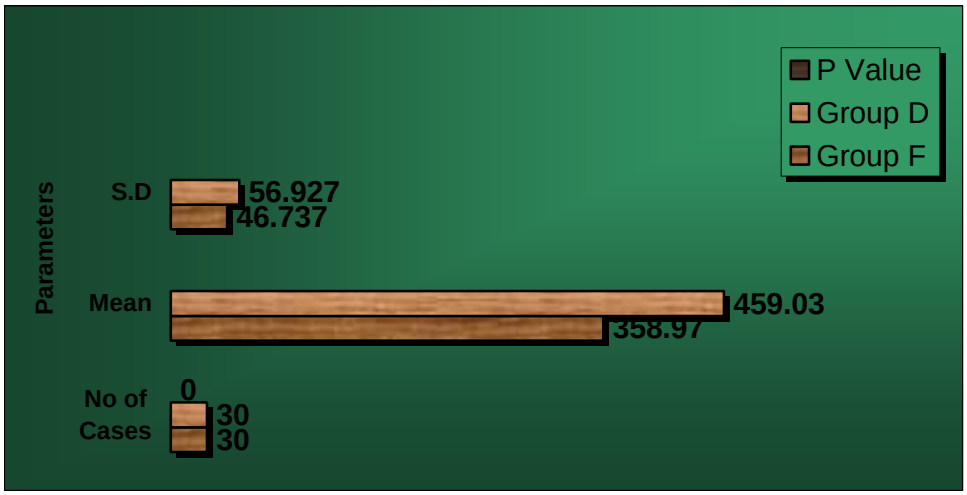
Distribution of Mean ONSET of Sensory Blocks T6 in Mins by Groups



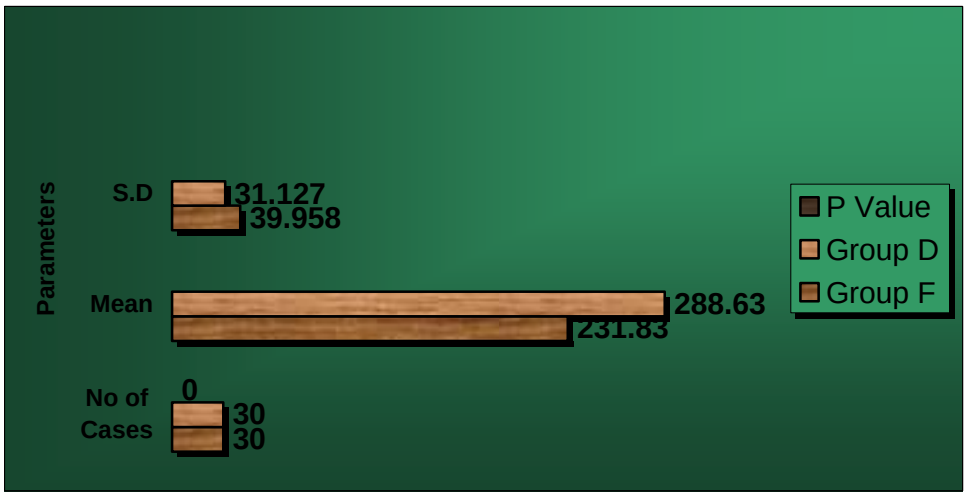
Distribution of Mean Time to Reach Motor Block B3 in Mins by Groups



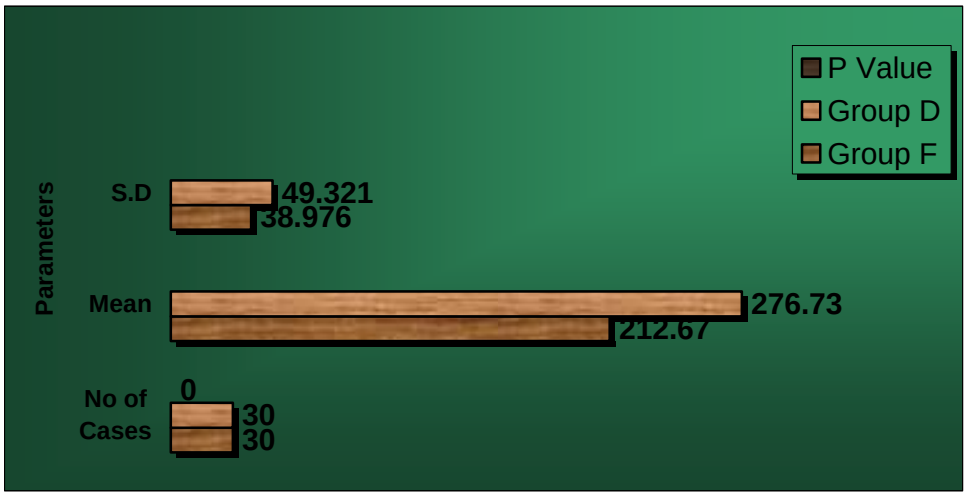
Distribution of Mean Time for Regression of Sensory Block [S1] Mins by Groups



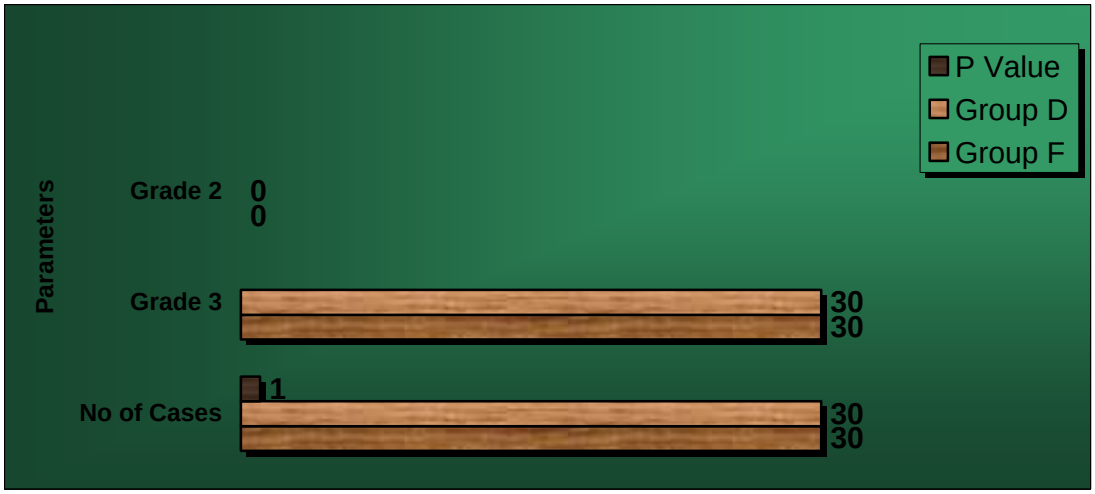
Distribution of Mean Time for Regression of Motor Block [B0] Mins by Groups



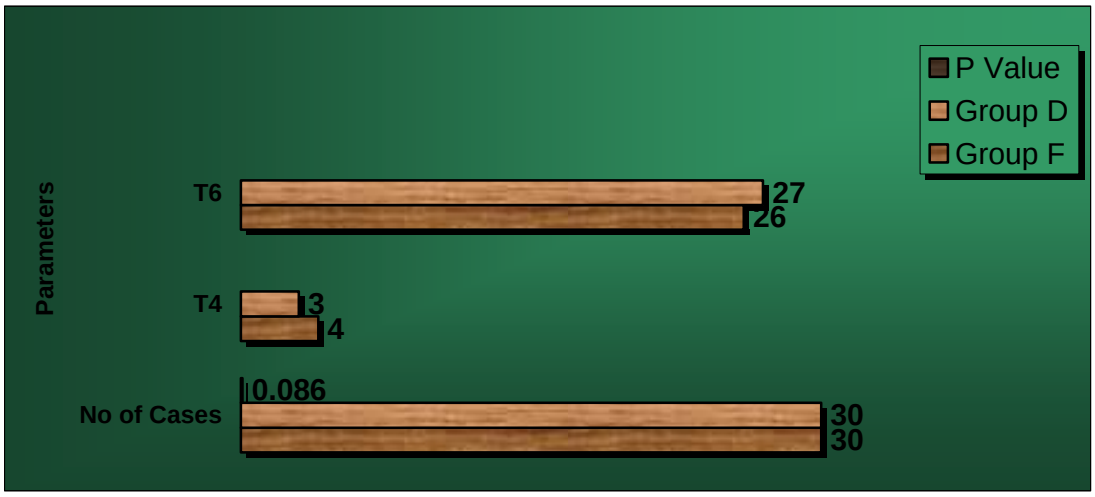
Distribution of Mean Time for Rescue Analgesia Mins by Groups



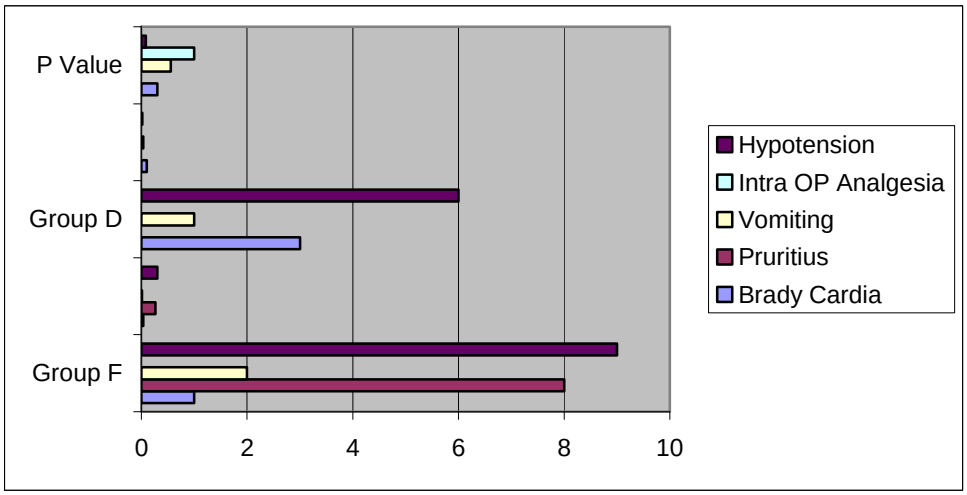
Maximum Grade of Motor Block by Groups



Maximum Level of Sensory Block [T4-T6] by Groups



Distribution of Cases by Groups and Side Effects



S.NO	Age	Diagnosis	Procedure	ASA	Duration of surgery in mins	Intra op Side Effects	Drugs	IOP ANAL	PSB	MMB	Con.to GA	QSA	SENSORY BLOCK IN MIN			MOTOR BLOCK in Mins		RESCUE
													T10	T6	regress to S1	PMB	regress	ANALG in MIN
	Group BF 2.8 cc of 0.5% Bupivacaine + 25 µg Fentanyl 0.5 cc																	
1	35	UVP	VH/PFR	1	95	P		NIL	T6	B3	NIL	EXC.	3	5	386	7	240	300
2	45	AUB	VH	1	40	P/H	EP 6	NIL	T6	B3	NIL	EXC.	3	5	379	7	186	220
3	47	UVP	VH/PFR	1	60	P/H/B	EP6/A0.6	NIL	T6	B3	NIL	EXC.	3	6	340	7	322	225
4	35	AUB	VH	1	90	NIL		NIL	T6	B3	NIL	EXC.	3	6	392	7	243	240
5	50	UVP	VH/PFR	1	100	H	EP 6	NIL	T6	B3	NIL	EXC.	3	5	394	7	277	210
6	47	FU	VH	1	65	H	EP 12	NIL	T4	B3	NIL	EXC.	2	5	333	7	161	120
7	50	UVP	VH/PFR	1	40	P	NIL	NIL	T6	B3	NIL	EXC.	3	5	361	7	183	213
8	55	UVP	VH/PFR	1	90	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	5	350	7	250	210
9	40	AUB	VH	1	85	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	6	348	7	281	185
10	55	UVP	VH/PFR	1	60	V	EM 4	NIL	T6	B3	NIL	EXC.	3	5	355	7	250	207
11	39	FU	VH	1	60	H	EP 6	NIL	T6	B3	NIL	EXC.	4	6	330	8	240	210
12	50	UVP	VH/PFR	1	65	V/P/H	EM4/EP6	NIL	T6	B3	NIL	EXC.	3	6	245	7	226	170
13	40	AUB	VH	1	75	NIL	NIL	NIL	T4	B3	NIL	EXC.	3	4	366	6	246	270
14	37	AUB	VH	1	50	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	5	380	6	276	285
15	38	UVP	VH/PFR	1	60	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	4	283	6	191	195
16	56	FU	VH	1	55	NIL	NIL	NIL	T6	B3	NIL	EXC.	4	4	405	6	196	240
17	45	AUB	VH	1	70	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	4	365	7	295	180
18	55	UVP	VH/PFR	1	135	NIL	NIL	NIL	T4	B3	NIL	EXC.	2	4	517	6	301	285
19	34	AUB	VH	1	90	NIL	NL	NIL	T6	B3	NIL	EXC.	2	4	333	7	244	185
20	40	AUB	VH	1	40	NIL	NIL	NIL	T6	B3	NIL	EXC.	2	4	391	6	184	205
21	50	UVP	VH/PFR	1	100	H/P	EP6	NIL	T6	B3	NIL	EXC.	3	4	390	6	211	240
22	40	UVP	VH/PFR	1	55	NIL	NIL	NIL	T4	B3	NIL	EXC.	3	5	366	6	219	240
23	42	FU	VH	1	55	NL	NIL	NIL	T6	B3	NIL	EXC.	3	5	371	7	178	180
24	37	AUB	VH	1	35	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	6	350	7	240	190
25	40	AUB	VH	1	30	NIL	NIL	NIL	T6	B3	NIL	EXC.	2	4	368	6	230	200
26	50	UVP	VH	1	120	P/H/V	EM4/EP6	NL	T6	B3	NIL	EXC.	2	4	365	6	190	185
27	56	UVP	VH/PFR	1	90	NIL	NIL	NIL	T6	B3	NL	EXC.	2	4	366	6	195	180
28	40	AUB	VH	1	60	P/V/H	EM4/EP6	NIL	T6	B3	NL	EXC.	3	5	290	7	220	240
29	50	FU	VH	1	70	NIL	NL	NIL	T6	B3	NIL	EXC.	3	4	350	6	240	195
30	40	AUB	VH	1	85	NIL	NL	NIL	T6	B3	NIL	EXC.	3	5	300	7	240	175

INTRAOP VITALS MONITORING GROUP F

		Time in Mins					Heart Rate																				
S.NO	Basal	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135
1	109	109	101	98	98	98	96	97	99	100	95	91	83	86	86	89	91	80	86	86	83	84	84	86	83	83		
2	72	72	90	68	64	66	68	72	70	72	70	72	71	70	72	72	72	70	72									
3	68	68	64	60	62	62	49	48	70	72	68	64	66	68	64	68	66	64	62									
4	87	87	81	88	88	62	79	79	78	72	72	78	78	72	78	78	70	76	76	74	74	72	72	70	72			
5	86	86	88	86	84	84	84	88	86	78	78	78	78	76	80	80	80	78	78	78	80							
6	70	70	72	70	80	78	84	88	90	92	88	86	86															
7	80	80	78	74	73	74	72	68	68	68																		
8	64	64	63	62	63	63	58	59	59	59	62	60	60	56	58	58	58	55	56	57	57	56						
9	89	89	86	86	86	90	86	81	86	82	84	84	79	88	84	75	75	84	85	84	82	83	82	84	88			
10	83	83	82	90	79	71	68	66	62	66	68	60	64	112	64	66	66	68	64									
11	78	78	76	78	71	71	71	68	67	66	70	67	66	66														
12	77	77	73	71	80	74	76	79	80	77	77	77	79	79	78	86	86	87										
13	75	75	76	69	68	66	64	65	70	70	68	65	64	71	77	64	64	64										
14	110	110	95	86	84	94	77	73	75	71	72	72	72	73														
15	72	72	67	69	66	69	72	63	62	64	56	58	64	57	58													
16	96	96	94	89	79	80	83	81	80	73	72	69	68	77	72	72	70	72	72	70	78	76	74	78	80			
17	96	96	98	98	99	98	98	97	96	97	98	99	110	112	110	99	98											
18	108	108	92	88	84	84	83	81	82	82	72	73	73	74	72	73	63	62	69	62	62	68	68	72	88	86	84	83
19	107	107	107	106	103	97	85	77	81	86	90	86	87	86	82	82	84	82	86	87	81	81	86					
20	68	68	68	66	64	60	68	62	65	64	64	62	61	60	62													
21	69	69	74	76	71	61	64	68	79	81	80	84	69	88	80	91	92	92	90	88	84	84	82	81				
22	82	82	86	84	83	82	80	78	76	74	68	68	70	72	74	78	87											
23	80	80	82	80	82	80	78	76	74	72	68	67	64	64														
24	108	108	106	98	96	94	98	98	96	98	96	100																
25	86	86	84	86	82	88	86	82	78	76	76	74																
26	86	86	84	82	81	80	78	78	79	76	74	73	72	71	70	68	68	70	70									
27	78	78	76	74	71	70	72	70	68	68	68	66	68															
28	90	90	90	90	90	89	88	87	84	86	86	88	80	81	80													
29	80	80	78	77	75	74	72	71	70	72	74	72	70	68	68	70	75	74										
30	76	76	77	74	78	76	78	76	75	74	72	70	68	70	72	74	75											

		Time in Mins					Blood Pressure																			
S.NO	Basal	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135
1	144/97	144/97	123/74	122/78	118/74	129/84	113/89	114/72	113/73	112/73	112/77	111/75	111/75	112/75	112/57	99/72	104/64	100/64	105/65	101/67	103/70	110/80	101/67	110/70	110/70	120/70		
2	135/87	135/87	101/56	102/51	89/47	106/61	98/56	114/68	111/70	106/62	104/64	106/62	104/63	104/60	106/63	108/60	111/70	110/78	118/80									
3	110/70	110/70	90/60	90/60	80/60	80/60	90/70	90/60	85/60	97/58	91/63	97/63	87/53	87/43	98/60	98/60	88/50	88/50	98/70	98/63								
4	120/70	120/70	120/75	123/67	116/62	118/72	110/72	109/68	97/65	100/65	100/66	97/57	97/63	94/58	88/58	113/69	102/62	108/68	112/57	107/59	120/64	126/76	133/80	133/80	128/80			
5	121/84	121/84	132/85	125/80	112/73	110/68	117/66	118/79	118/79	128/76	118/81	117/68	106/69	106/69	116/76	117/66	117/66	118/79	128/96	117/68	116/76							
6	110/80	110/80	100/80	100/70	90/60	100/70	100/70	80/60	100/70	80/70	96/70	90/70	100/72															
7	130/90	130/90	135/78	137/74	140/90	151/96	145/70	149/78	140/90	137/74																		
8	110/70	110/70	110/80	130/80	110/70	111/65	110/67	122/68	113/65	115/67	112/71	113/69	111/71	110/65	116/64	106/65	106/65	106/65	104/67	104/67	105/64							
9	120/80	120/80	117/84	120/69	117/74	107/64	111/64	108/66	111/63	109/61	105/57	102/58	106/66	110/64	108/68	114/66	109/69	108/68	112/71	118/70	120/74	108/68	110/70	111/63	108/66			
10	153/82	153/82	133/82	132/78	122/69	112/68	108/64	113/64	107/64	105/58	104/61	105/64	102/62	106/56	99/59	107/58	109/60	103/60	104/62									
11	111/76	111/76	108/73	105/76	101/69	103/67	102/72	97/62	99/68	99/63	94/61	97/59	91/58	88/49	106/68													
12	114/89	114/89	98/68	83/54	104/72	101/70	103/73	90/62	108/70	97/63	92/66	93/58	97/58	89/65	115/82	110/79	113/81	104/79										
13	156/96	156/96	160/90	140/90	142/81	150/80	130/85	120/79	112/79	112/80	111/70	114/78	110/70	118/72	112/70	100/71	89/63	98/62										
14	133/83	133/83	133/83	120/68	117/62	112/64	111/64	110/55	113/78	109/56	112/60	114/63	111/59	108/59	108/59													
15	114/69	114/69	116/74	108/74	120/79	105/67	101/66	99/60	91/64	98/64	98/59	95/62	99/68	102/67	99/67	111/74	123/82	114/84	111/77	106/74	106/74	117/81	111/77	106/74	106/74			
16	145/94	145/94	150/90	126/80	133/98	130/93	112/86	112/82	126/88	123/82	114/84	111/77	106/74	106/74	106/74	119/89	113/70											
17	122/86	122/86	122/88	124/75	126/80	124/79	112/80	122/77	115/74	116/76	107/73	113/69	113/70	121/78	121/78	113/70	112/64	116/72	116/72	102/68	102/68	100/70	109/70	118/69	117/57	100/67	109/60	102/68
18	146/80	146/80	145/95	146/90	141/97	130/90	128/92	125/69	109/64	112/64	118/69	117/57	116/67	109/60	109/60	100/70	102/73	102/73	102/73	102/73	111/71	120/82	120/80					
19	124/84	124/84	137/90	128/71	98/54	95/54	98/58	99/68	105/65	103/67	106/65	112/69	110/68	118/78	118/78	112/73												
20	120/80	120/80	110/80	110/80	120/80	110/70	107/60	110/70	110/80	110/70	100/60	110/70	108/68	110/70	110/70													
21	155/82	155/82	115/69	104/68	104/60	97/56	96/55	80/57	108/54	88/54	98/55	108/61	93/60	96/56	87/43	85/44	99/69	110/80	114/75	114/70								
22	140/80	140/80	150/80	115/72	121/77	121/77	111/77	114/75	114/75	119/76	117/76	110/77	116/70	116/77	110/70	110/70	110/70											
23	130/80	130/80	140/80	128/87	127/73	121/70	119/76	119/73	119/73	112/60	117/67	113/67	110/70	117/67														
24	150/80	150/80	150/80	140/80	139/88	129/85	118/78	106/70	106/70	110/72	110/72																	
25	120/76	120/76	113/69	124/82	113/62	100/70	97/85	113/69	113/69	120/80	113/62																	
26	130/80	130/80	120/78	110/78	110/70	110/68	110/68	110/70	120/80	110/72	100/68	100/68	110/70	110/68	120/80	110/78	110/68	110/70	110/68									
27	133/83	133/83	130/80	110/78	120/80	118/78	120/78	118/78	110/68	106/61	88/60	110/76	120/80															
28	120/80	120/80	130/80	118/78	117/64	107/64	110/70	113/65	110/68	100/65	100/65	110/70	118/75	120/70	118/75													
29	120/70	120/70	120/75	123/67	116/62	118/72	110/68	118/72	112/73	112/77	117/75	111/75	111/70	108/68	110/70	118/78	120/80	120/80										
30	110/70	110/70	117/84	117/74	107/64	111/65	111/64	113/65	115/67	112/71	113/69	111/71	110/70	108/68	110/70	118/78												

	Time in Mins							RSS																			
S No.	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135
1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2									
3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2									
4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2							
6	2	2	2	2	2	2	2	2	2	2	2	2															
7	2	2	2	2	2	2	2	2	2																		
8	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2						
9	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
10	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2									
11	2	2	2	2	2	2	2	2	2	2	2	2	2														
12	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2										
13	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2										
14	2	2	2	2	2	2	2	2	2	2	2	2	2														
15	2	2	2	2	2	2	2	2	2	2	2	2	2	2													
16	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
17	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2											
18	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
19	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
20	2	2	2	2	2	2	2	2	2	2	2	2	2	2													
21	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
22	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2											
23	2	2	2	2	2	2	2	2	2	2	2	2	2														
24	2	2	2	2	2	2	2	2	2	2	2																
25	2	2	2	2	2	2	2	2	2	2	2																
26	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2									
27	2	2	2	2	2	2	2	2	2	2	2	2															
28	2	2	2	2	2	2	2	2	2	2	2	2	2	2													
29	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2										
30	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2											

	Time in Mins						SPO2																			
S.NO	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135
1	99%	99%	99%	99%	99%	99%	99%	98%	99%	99%	97%	98%	98%	98%	98%	99%	98%	98%	98%	98%	98%	98%	98%	98%	99%		
2	99%	99%	99%	98%	99%	98%	99%	99%	99%	99%	97%	98%	98%	98%	99%	99%	99%	99%									
3	99%	99%	99%	98%	98%	98%	99%	99%	99%	99%	97%	98%	99%	99%	99%	99%	99%	99%									
4	100%	100%	100%	99%	99%	99%	99%	99%	99%	99%	97%	99%	99%	99%	99%	99%	99%	99%	98%	99%	99%	98%	99%	99%			
5	99%	99%	99%	99%	98%	99%	98%	98%	99%	99%	98%	99%	98%	97%	97%	98%	98%	98%	98%	98%							
6	99%	98%	98%	99%	98%	98%	99%	99%	99%	98%	98%	98%															
7	97%	97%	97%	100%	98%	98%	100%	99%	99%																		
8	98%	98%	98%	99%	99%	99%	99%	99%	100%	98%	99%	98%	98%	98%	98%	98%	98%	98%	98%	99%	99%						
9	99%	99%	99%	99%	99%	100%	99%	98%	98%	99%	99%	99%	98%	98%	98%	97%	97%	97%	99%	99%	98%	98%	98%	98%			
10	99%	98%	98%	98%	98%	99%	98%	98%	99%	98%	98%	99%	98%	98%	98%	98%	99%	99%									
11	98%	99%	99%	99%	99%	99%	99%	99%	99%	97%	98%	98%	98%														
12	100%	100%	100%	100%	99%	98%	99%	99%	98%	99%	98%	99%	98%	98%	99%	98%	98%										
13	100%	100%	100%	99%	99%	99%	98%	99%	98%	98%	99%	99%	98%	98%	98%	98%	98%										
14	99%	99%	99%	100%	98%	99%	99%	97%	99%	98%	99%	98%	99%														
15	98%	98%	98%	99%	99%	98%	100%	97%	98%	99%	99%	98%	99%	99%													
16	99%	99%	99%	99%	99%	98%	100%	99%	99%	98%	99%	99%	99%	98%	98%	98%	98%	99%	99%	98%	98%	98%	98%	99%			
17	100%	100%	100%	98%	98%	99%	99%	98%	98%	98%	100%	99%	99%	99%	98%	98%											
18	99%	99%	99%	99%	99%	99%	99%	99%	99%	98%	100%	99%	99%	97%	97%	97%	98%	98%	98%	99%	99%	99%	99%	99%	99%	98%	99%
19	98%	98%	98%	99%	99%	100%	98%	98%	99%	99%	99%	98%	99%	99%	98%	98%	98%	99%	99%	99%	98%	98%					
20	99%	99%	99%	99%	99%	99%	98%	98%	99%	99%	99%	98%	98%	98%													
21	98%	98%	98%	99%	98%	99%	98%	99%	99%	99%	98%	98%	99%	99%	99%	98%	98%	98%	98%	98%	98%	98%					
22	99%	99%	99%	985%	98%	99%	98%	99%	99%	99%	98%	98%	98%	97%	97%	97%											
23	100%	100%	100%	99%	99%	98%	99%	99%	99%	99%	99%	98%	99%														
24	99%	99%	99%	99%	100%	99%	99%	99%	99%	98%	98%																
25	99%	99%	99%	98%	99%	98%	99%	99%	99%	98%	99%																
26	98%	98%	98%	98%	98%	99%	99%	99%	99%	98%	99%	99%	98%	98%	98%	98%	98%	98%									
27	99%	99%	99%	98%	98%	99%	100%	100%	99%	98%	99%	97%															
28	99%	99%	99%	98%	98%	98%	100%	100%	99%	99%	99%	97%	98%	98%													
29	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	98%	98%	98%	98%	99%										
30	99%	99%	99%	99%	99%	99%	99%	99%	99%	98%	99%	99%	98%	98%	98%	98%											

	Time in Mins					RR																			
S.N0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135
1	16	16	14	14	14	14	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12			
2	14	14	14	14	14	14	12	12	12	12	12	12	12	12	12	12	12	12									
3	18	18	16	14	14	14	12	12	12	12	14	14	14	14	14	14	12	12									
4	14	14	14	14	16	14	12	12	12	12	12	12	14	14	12	12	12	12	14	14	12	12	12	14			
5	16	14	14	14	14	14	12	14	12	14	14	14	14	14	12	12	12	12	12	12							
6	18	16	14	14	14	14	14	14	12	12	12	12															
7	16	16	14	14	14	16	12	12	12																		
8	14	14	14	14	14	16	14	12	12	12	12	12	12	12	12	12	14	14	12	12	12						
9	16	16	16	14	14	14	14	12	12	12	12	12	12	12	12	14	14	14	14	12	12	12	12	12			
10	16	16	16	16	16	14	14	12	12	12	12	12	14	14	14	14	14	12									
11	16	16	16	14	14	16	14	12	12	12	12	12	12														
12	16	16	16	16	16	14	16	14	14	12	12	14	14	14	12	12	14										
13	16	16	16	16	16	14	14	14	14	12	12	12	12	12	12	12	12										
14	16	16	16	16	16	14	14	14	14	12	12	12	12														
15	14	14	14	14	14	16	14	14	14	12	12	12	12	12													
16	16	16	16	16	16	14	14	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12			
17	16	16	16	16	14	14	14	12	12	12	12	12	12	12	12	12											
18	16	16	16	16	16	14	14	14	12	14	14	14	14	14	14	14	16	16	16	16	16	14	14	14	14	14	14
19	18	18	18	16	14	14	14	12	12	14	14	14	14	14	14	14	14	14	14	14	14	14					
20	16	16	16	14	14	14	14	12	12	12	12	12	12	12													
21	16	16	16	14	12	14	14	12	12	14	14	14	14	14	14	14	14	14	14	14	14	14	14				
22	14	14	14	12	12	14	14	12	12	12	12	12	12	12	12	12											
23	16	16	16	14	14	14	14	12	12	12	12	12	12														
24	16	16	16	14	14	14	14	12	12	12	12																
25	16	16	16	14	14	14	14	12	12	12	12																
26	16	16	16	14	14	14	12	12	12	14	14	14	14	14	14	14	14	14									
27	18	18	18	16	14	14	12	12	12	12	12	12															
28	16	16	16	16	14	14	12	12	12	12	12	12	12	12													
29	16	16	16	14	14	14	12	12	12	14	14	14	14	14	14	14	14										
30	18	18	18	16	14	14	12	12	12	14	12	12	12	12	12	12											

POST OP MONITORING GROUP F																								
		Time in Mins					Heart Rate																	
S.NO	Basal	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360
1	84	84	84	83	82	90	88	86	84	98	98	100	96	96	94	93	88	86	84	84	82	80			
2	66	66	68	66	68	68	70	72	72	69	60	64	66	62	68	68	72	72	80	72	78	80			
3	70	70	68	70	72	68	70	72	76	78	80	72	78	78	80	82	80	82	82						
4	74	74	76	74	76	74	76	74	76	74	76	74	74	74	76	74	74	76	74	80	81	86			
5	86	86	88	84	84	84	88	86	84	84	84	84	86	84	84	86	86	84	84	86					
6	87	87	88	86	88	86	88	86	92	94	94	88	86	85	84	83	84	84	82						
7	70	70	72	72	74	70	70	72	72	74	74	74	70	72	72	74	70	68	70	72	70	72	70	72	
8	65	65	65	64	64	65	67	78	66	67	78	66	70	68	63	64									
9	81	81	74	74	68	70	68	49	45	42	60	64	61	62	64	65	61	62	64						
10	69	69	68	68	66	64	63	68	70	64	64	66	68	70	65	76	75	72	80						
11	70	70	70	68	70	68	68	71	69	70	68	69	70	70	70	70									
12	89	89	89	83	88	91	92	87	89	90	82	80	80												
13	68	68	64	68	64	68	64	64	68	64	68	64	68	64	64	64	72	72	72						
14	68	68	64	66	68	70	72	74	74	72	72	72	70	70	72	70	70	70	72	70					
15	72	72	70	72	72	72	70	70	70	72	70	72	70	72	70	70	72	72							
16	77	77	77	77	78	72	80	84	82	82	84	81	81	82	82	76	74	76	78						
17	110	110	112	110	112	106	108	104	100	100	98	96	98	92	96	98									
18	65	65	63	63	70	72	70	74	74	72	77	80	77	80	77	80	77	80	71	77	80	77	72	74	76
19	84	84	82	80	81	80	82	82	82	82	80	80	80	80	82	82									
20	72	72	70	68	68	66	70	72	74	74	78	78	72	68	68	66	68	66	66	68	66	64	64		
21	70	70	72	70	70	70	68	68	70	72	68	60	72	78	60	71	70	72	72	70					
22	85	85	84	85	84	84	85	84	85	84	85	84	84	84	83	83	84	84	82	82	82	86	88		
23	80	80	82	82	80	88	84	86	88	84	86	88	82	84	78	76	78	78	74	80	82	82			
24	108	108	106	104	100	98	96	94	96	94	96	96	98	92	96	98	94	96	98	94	94	98			
25	88	88	90	92	90	94	95	92	93	94	95	92	90	90	92	88	88	90	91	88	86	88	86	90	
26	72	72	71	72	74	72	70	72	74	74	76	78	78	80	81	82	84	86	80	82					
27	70	70	68	70	72	68	70	72	72	74	76	74	74	76	76	76	78								
28	70	70	72	72	74	70	70	70	72	74	78	80	86	86	84	88	86	86	86	88					
29	84	84	83	83	82	90	88	86	84	98	100	96	96	94	93	93									
30	70	70	70	68	68	72	68	70	70	72	78	76	76	76	74	74									

		Time in Mins						Blood Pressure															
S.NO	Basal	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345
1	110/70	110/70	103/70	100/64	100/64	104/64	112/67	112/67	113/74	112/72	110/70	110/70	105/68	101/67	105/64	103/70	103/70	100/70	110/80	120/80	120/80	120/80		
2	100/70	100/70	110/70	118/68	108/68	103/60	110/70	110/70	104/65	122/84	120/90	107/61	110/70	110/70	110/70	103/80	110/80	110/80	110/80	110/80	100/78	100/78		
3	110/70	110/70	100/60	100/60	104/64	100/60	98/62	110/70	110/72	110/80	110/70	110/80	1110/70	108/70	108/70	110/70	100/70	110/70	110/70					
4	110/60	110/60	100/68	110/70	110/70	100/68	100/60	90/60	92/62	110/70	110/70	108/60	108/68	110/70	110/70	100/68	100/68	110/70	110/70	100/68	110/70	110/70		
5	120/80	120/80	130/80	122/80	112/73	110/68	110/68	110/68	120/80	112/78	112/78	120/80	130/80	130/80	130/80	120/80	118/80	120/80	112/73	128/76				
6	120/80	120/80	120/87	120/80	110/80	110/80	120/80	120/80	110/80	130/80	130/80	140/90	130/80	120/70	120/80	120/80	110/70	110/70	120/80					
7	120/70	120/70	120/70	120/80	130/80	130/80	120/80	120/70	120/80	120/80	130/80	140/80	130/80	130/70	130/80	110/70	130/80	130/80	120/80	120/78	120/80	128/78	110/70	110/70
8	110/70	110/70	113/78	110/70	113/78	112/71	116/72	105/67	94/56	103/65	120/80	112/78	110/70	113/64	110/70	103/65								
9	131/90	131/90	135/89	135/89	144/80	142/90	143/93	135/95	150/80	154/44	145/90	150/90	151/90	137/93	135/90	150/90	140/90	140/90	150/90					
10	104/64	104/64	110/60	114/69	108/69	119/66	111/69	121/71	129/79	135/70	125/80	123/71	122/70	118/68	120/70	118/70	108/73	106/70	108/68					
11	104/64	104/64	110/60	114/69	108/69	119/66	111/69	121/71	129/79	135/70	125/80	123/71	122/70	118/68	120/70	118/70								
12	107/77	107/77	102/63	100/56	106/72	102/72	118/79	114/77	108/73	114/81	110/78	100/70	100/70											
13	90/60	90/60	110/60	120/70	110/60	100/60	100/60	90/60	100/60	100/60	100/60	110/70	110/70	100/70	100/70	100/70	100/80	110/90	100/80					
14	90/60	90/60	92/60	90/60	100/60	100/60	100/70	100/60	100/70	100/60	100/70	100/60	100/60	100/60	100/60	100/60	110/70	110/70	110/70					
15	110/60	110/60	100/60	110/60	100/60	100/60	110/60	100/60	100/60	100/60	100/60	110/70	110/70	120/80	120/80	110/70	110/70							
16	98/61	98/61	97/60	97/70	102/72	104/70	102/72	106/72	110/70	110/70	120/80	130/80	120/80	100/80	120/76	116/72	110/72	106/72	110/76	116/72				
17	110/80	110/80	112/80	110/80	112/70	110/70	106/72	106/70	106/74	100/70	102/76	102/70	110/76	120/76	120/76	126/74								
18	130/70	130/70	130/70	125/69	120/70	120/70	110/80	110/80	120/80	120/80	130/80	130/80	140/80	140/80	140/80	130/80	140/80	140/80	140/80	138/78	130/80	130/80	130/80	140/80
19	110/80	110/80	110/70	100/70	110/70	100/60	110/70	110/60	110/70	100/70	110/70	100/60	110/60	110/60	110/70									
20	100/60	100/60	98/60	110/60	107/67	103/60	110/68	110/70	110/70	120/80	127/78	118/80	116/72	110/76	100/60	110/70	110/70	108/68	110/70	120/80	120/80	110/78	110/78	
21	100/60	100/60	90/62	100/62	100/60	98/70	100/60	98/70	98/70	98/70	100/60	110/60	100/60	113/80	110/80	112/82	106/70	110/70	117/63	110/70				
22	140/80	140/80	130/80	140/80	130/78	130/70	140/70	150/70	150/80	140/70	150/70	114/70	150/70	150/70	151/83	130/80	130/80	130/80	120/80	110/70	130/80	130/80	130/80	
23	128/80	128/80	130/70	120/70	124/73	119/76	114/73	115/69	112/66	112/60	117/67	113/69	112/67	103/56	110/70	120/80	130/80	120/80	124/73	120/80	115/69	120/70		
24	108/78	108/78	120/80	110/70	120/80	110/80	120/80	130/80	130/80	140/80	120/80	120/80	120/80	130/80	130/80	140/80	140/80	130/80	130/80	140/80	140/80	140/80		
25	110/80	110/80	120/80	110/80	110/70	110/80	120/78	110/70	110/70	120/80	128/78	130/80	110/80	120/80	120/80	110/70	118/78	106/70	110/70	120/70	118/80	118/78	120/80	120/80
26	110/70	110/70	110/70	118/68	108/68	103/60	110/70	110/70	104/65	122/84	120/80	107/61	110/70	110/70	110/70	103/80	105/64							
27	110/60	110/60	100/68	110/70	110/70	110/70	103/60	110/70	104/65	122/84	110/70	107/61	103/80	103/80	110/70	120/80	110/80	110/80						
28	120/80	120/80	110/60	118/68	108/68	110/68	112/67	110/60	113/74	112/72	110/70	110/70	105/68	101/67	120/80	130/80	130/80	130/80	130/80	130/80				
29	110/80	110/80	120/80	118/68	118/68	110/68	112/67	110/80	110/70	110/70	100/60	110/60	110/76	120/80	110/78	120/80	120/80							
30	131/90	131/90	135/89	138/88	135/8-	140/90	141/92	140/90	140/90	138/90	130/90	138/90	130/90	130/90	130/90									

		Time in Mins						PAIN SCORE															
S.NO	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360
1	0	0	0	0	0	0	1	1	2	2	2	2	2	1	1	1	0	0	0	0	0			
2	0	0	0	0	0	0	0	0	1	1	1	2	2	2	2	2	1	1	1	1	1			
3	0	0	0	0	0	0	1	1	2	2	2	2	1	1	1	1	0	0						
4	0	0	0	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	0	0			
5	0	0	0	0	0	1	1	2	2	2	2	2	1	1	1	1	1	0	0					
6	0	0	0	0	0	0	0	1	2	2	2	2	2	2	1	1	0	0						
7	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	2	1	1	1	0	0	
8	0	0	0	0	1	1	2	2	3	3	2	2	2	0	0									
9	0	0	0	0	0	2	2	1	1	2	2	2	2	1	1	0	0							
10	0	0	0	0	0	0	0	2	2	2	2	3	3	2	2	1	0	0						
11	0	0	0	0	0	0	0	2	2	2	2	3	3	2	2									
12	0	0	0	0	1	2	1	1	2	0	0													
13	0	0	0	0	0	0	0	0	0	1	3	3	2	1	1	1	0	0						
14	0	0	0	0	0	1	2	2	1	1	1	1	1	0	0	0	0	0	0					
15	0	0	0	1	2	3	3	2	2	1	1	1	0	0	0	0								
16	0	0	0	1	1	1	2	2	2	2	2	1	1	1	1	0	0	0	0					
17	0	0	0	0	0	1	1	2	2	2	1	1	1	0	0									
18	0	0	0	0	0	0	0	0	0	1	1	1	2	2	2	1	1	1	1	0	0	0	0	0
19	0	0	0	0	0	1	1	2	2	1	0	0	0											
20	0	0	0	0	0	0	1	2	2	2	2	2	1	1	1	1	1	0	0	0	0	0		
21	0	0	0	0	0	0	0	0	1	2	2	2	2	1	1	1	1	0	0	0	0			
22	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	1	1	1	1	0	0	0		
23	0	0	0	0	0	1	2	2	2	2	2	1	1	1	1	1	0	0	0	0	0			
24	0	0	0	0	0	0	1	1	2	2	2	2	2	1	1	1	1	1	0	0	0			
25	0	0	0	0	0	0	0	0	1	2	2	2	2	2	1	1	1	0	0	0	0			
26	0	0	0	0	0	0	1	1	2	2	2	2	2	1	1	1	1	0	0					
27	0	0	0	0	1	1	1	2	2	2	2	2	2	2	2	2	1	1	0	0				
28	0	0	0	0	1	1	1	2	2	2	2	2	2	1	1	1	1	1	0	0				
29	0	0	0	0	1	1	2	2	2	2	2	2	1	1	0	0	0							
30	0	0	0	0	1	1	2	2	2	2	2	2	1	1	0	0								

	Time in Mins					Ramsay Sedation Score																	
S.N0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360
1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2						
4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
6	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2						
7	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
8	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2									
9	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2							
10	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2							
11	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2									
12	2	2	2	2	2	2	2	2	2	2														
13	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2						
14	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
15	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2								
16	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
17	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
18	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2									
19	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
20	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
21	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
22	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
23	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
24	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
25	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
26	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
27	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2								
28	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
29	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2								
30	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2									

	Time in Mins						ADVERSE EFFECTS																	
S.NO	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360
1	NIL	NIL	NIL	NIL	NL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL			
2	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL			
3	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL					
4	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL			
5	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL					
6	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL						
7	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
8	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL									
9	NIL	NIL	NIL	NIL	NIL	NIL	B	B	B	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL			
10	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NV	NIL	NIL	NIL								
11	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL						
12	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL														
13	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL						
14	NIL	NIL	NV	NIL	NIL	NIL	NIL	NIL	NV	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL						
15	NIL	NIL	NV	NIL	NIL	NIL	NIL	NIL	NV	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL						
16	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL					
17	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL						
18	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
19	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL						
20	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL		
21	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL					
22	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL				
23	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL			
24	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL			
25	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
26	NL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL					
27	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL					
28	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL					
29	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL				
30	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL				

	Time in Mins						**LEVEL OF SENSORY BLOCK**																
S.N0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360
1	T6	T6	T6	T6	T8	T8	T8	T10	T10	T12	T12	L1	L1	L2	L3	L3	L4	L4	L5	L5	S1			
2	T6	T6	T6	T6	T8	T8	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1			
3	T8	T10	T10	T12	T12	T12	L1	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1						
4	T8	T8	T10	T10	T10	T12	T12	T12	L1	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1				
5	T8	T8	T10	T10	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1					
6	T6	T6	T6	T6	T8	T8	T10	T10	T12	L1	L2	L2	L3	L4	L4	L5	L5							
7	T6	T6	T6	T6	T6	T6	T8	T8	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1	
8	T12	T12	T12	L1	L1	L2	L2	L3	L3	L3	L4	L4	L5	L5	S1									
9	T8	T9	T9	T10	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1							
10	T6	T6	T8	T8	T10	T10	T12	L1	L1	L2	L2	L3	L3	L3	L4	L5	L5	S1						
11	T6	T6	T8	T8	T10	T10	T12	L1	L1	L2	L2	L3	L3	L3	L4									
12	T11	T12	T12	L1	L2	L2	L3	L3	L4	L5	S1													
13	T8	T10	T10	T12	T12	L1	L1	L2	L2	L2	L3	L3	L4	L4	L5	L5	L5	S1						
14	T6	T8	T8	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1						
15	T6	T8	T8	T10	T12	T12	L1	L2	L2	L2	L3	L3	L4	L4	L5	S1								
16	T10	T10	T12	T12	T12	L1	L1	L1	L2	L2	L3	L3	L3	L4	L4	L5	L5	L5	S1					
17	T12	T12	L1	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	L5	S1									
18	T8	T8	T8	T8	T10	T10	T12	T12	L1	L1	L1	L2	L2	L2	L3	L3	L3	L4	L4	L4	L5	L5	L5	L5
19	T10	T10	T12	T12	L1	L1	L1	L2	L2	L3	L3	L4	L4	L5	S1									
20	T8	T8	T8	T10	T10	T10	T12	T12	L1	L1	L1	L2	L2	L3	L3	L3	L4	L4	L5	L5	S1			
21	T8	T8	T8	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L4	L5	L5	S1					
22	T6	T8	T8	T10	T10	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1				
23	T6	T6	T8	T8	T8	T10	T10	T12	T12	L1	L1	L2	L2	L2	L3	L3	L4	L4	L5	L5	S1			
24	T6	T6	T8	T8	T8	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1				
25	T6	T8	T8	T8	T10	T10	T10	T12	T12	T12	L1	L1	L4	L2	L2	L3	L3	L4	L4	L5	L5	S1		
26	T6	T8	T8	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	L5	S1					
27	T8	T8	T10	T10	T12	T12	L1	L1	L2	L3	L3	L4	L4	L5	L5	S1								
28	T6	T6	T8	T8	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1					
29	T8	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1								
30	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1									

	Time in Mins						**LEVEL OF MOTOR BLOCK**						
S.NO	15	30	45	60	75	90	105	120	135	150	165	180	195
1	B3	B3	B3	B3	B2	B2	B2	B1	B1	B1	BO		
2	B2	B2	B2	B2	B1	B1	B1	B0					
3	B3	B2	B2	B2	B2	B1	B1	B1	B0				
4	B3	B3	B3	B2	B2	B2	B2	B1	B1	B1	B0		
5	B3	B2	B2	B2	B1	B1	B1	B1	B0				
6	B3	B2	B2	B2	B1	B1	BO						
7	B3	B3	B3	B3	B2	B2	B1	B1	B0				
8	B3	B2	B2	B2	B2	B1	B1	B0					
9	B2	B1	B1	B0									
10	B3	B3	B3	B3	B3	B3	B2	B2	B1	B1	B0		
11													
12	B2	B2	B1	B1	B0								
13	B3	B3	B2	B2	B2	B2	B1	B1	B1	B0			
14	B3	B3	B3	B2	B2	B2	B1	B 1	B1	B1	B0		
15	B2	B2	B1	B1	B0								
16	B2	B2	B1	B1	B0								
17	B2	B2	B1	B1	B1	B0							
18	B3	B3	B2	B2	B2	B1	B1	B1	B0				
19	B3	B2	B2	B2	B1	B1	B1	B1	B0				
20	B3	B2	B2	B2	B1	B1	B1	B0					
21	B2	B2	B2	B1	B1	B1	B0						
22	B3	B3	B2	B2	B2	B2	B1	B1	B1	B0			
23	B3	B2	B2	B2	B1	B1	B1	B0					
24	B3	B3	B3	B2	B2	B2	B2	B1	B1	B1	B1	B0	
25	B3	B3	B3	B3	B2	B2	B2	B2	B1	B1	B1	B1	B0
26	B2	B2	B2	B2	B1	B1	B0						
27	B3	B2	B2	B2	B2	B2	B1	B1	B1	B1	B0		
28	B3	B3	B2	B2	B2	B2	B2	B1	B1	B1	B1	B0	
29	B3	B2	B2	B2	B2	B2	B1	B1	B0				
30	B3	B3	B2	B2	B2	B2	B1	B1	B1	B0			

S.NO	Age	Diagnosis	Procedure	ASA	Duration of surgery in min	Intra op Side Effects	Drugs	Need for intra op analgesia	PSB	MM B	Con. to GA	QSA	SENSORY BLOCK IN MINS			MOTOR BLOCK Time to reach		RESCUE ANALGESIA
		Group BD 2.8 cc of 0.5% Bupivacaine +5 µg DXM 0.5 cc											T10	T6	regress to S1	PMB	regress	TIME IN MINS
1	60	UVP	VH/PFR	1	65	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	5	487	7	248	310
2	47	AUB	VH	1	75	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	5	512	8	288	275
3	60	UVP	VH/PFR	1	90	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	5	390	7	271	300
4	44	FU	VH	1	50	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	5	487	7	293	295
5	39	FU	VH	1	65	**B**	A 0.6	NIL	T6	B3	NIL	EXC.	3	5	436	7	287	285
6	**40**	UVP	VH/PFR	1	120	**V**	EM 4	NIL	T6	B3	NIL	EXC.	3	6	465	7	335	190
7	55	UVP	VH/PFR	1	60	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	5	480	7	256	320
8	40	FU	VH	1	60	NIL	NIL	NIL	T4	B3	NIL	EXC.	3	5	421	6	267	210
9	49	AUB	VH	1	70	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	5	564	7	303	305
10	40	FU	VH	1	85	NIL	NIL	NIL	T6	B3	NIL	EXC.	2	4	390	6	211	230
11	41	AUB	VH	1	120	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	5	549	6	293	297
12	45	UVP	VH/PFR	1	60	**H**	EP 6	NIL	T6	B3	NIL	EXC.	3	5	396	7	277	210
13	55	AUB	VH	1	85	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	6	466	6	362	230
14	41	AUB	VH	1	80	B	A 0.6	NIL	T6	B3	NIL	EXC.	3	5	579	7	272	365
15	55	AUB	VH	1	60	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	6	376	6	342	305
16	48	FU	VH	1	45	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	4	425	7	300	245
17	42	AUB	VH	1	80	**H**	EP 6	NIL	T4	B3	NIL	EXC.	3	6	570	7	320	360
18	40	AUB	VH	1	100	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	4	380	7	300	280
19	43	UVP	VH/PFR	1	120	NIL	NIL	NIL	T6	B3	NIL	EXC.	2	4	489	7	338	270
20	41	AUB	VH	1	80	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	5	497	7	280	280
21	40	FU	VH	1	90	**H**	EP 6	NIL	T6	B3	NIL	EXC.	3	4	437	7	267	280
22	55	UVP	VH/PFR	1	60	NIL	NIL	NIL	T6	B3	NIL	EXC.	2	4	490	7	252	135
23	45	AUB	VH	1	80	NIL	NIL	NIL	T6	B3	NIL	EXC.	2	5	475	6	325	270
24	50	UVP	VH/PFR	1	80	NIL	NIL	NIL	T4	B3	NIL	EXC.	2	5	400	6	277	250
25	60	UVP	VH/PFR	1	55	NIL	NIL	NIL	T6	B3	NIL	EXC.	2	4	430	5	280	320
26	45	AUB	VH	1	65	NIL	NIL	NIL	T6	B3	nil	EXC.	2	4	450	5	290	305
27	48	AUB	VH	1	70	NIL	NIL	NIL	T6	B3	NIL	EXC.	2	4	465	6	270	335
28	42	FU	VH	1	65	**B**	**A 0.6**	NL	T6	B3	NIL	EXC.	2	4	425	6	290	305
29	50	UVP	VH/PFR	1	80	NIL	NIL	NIL	T6	B3	NIL	EXC.	2	4	440	6	285	280
30	52	UVP	VH/PFR	1	70	NIL	NIL	NIL	T6	B3	NIL	EXC.	3	5	400	6	280	260

POST OP MONITORING GROUP D

	Basal	Time in Mins					Heart Rate																							
S.NO	15	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	375	390	405	420	435	450
1	86	86	86	88	84	83	82	81	80	88	84	86	88	86	88	86	84	83	82	81	80	88	87	86	88	88	90	88	86		
2	80	80	85	88	90	92	94	92	90	90	86	88	90	92	90	92	90	80	86	88	84	88	90	92	90	92	90	92	90		
3	96	96	90	88	86	84	82	80	88	82	80	94	92	93	90	92	94	96	94	96	93										
4	94	94	96	94	91	90	88	72	90	92	90	90	90	92	90	99	96	98	96	94	93	90	88	86	88	84	82	88	86	78	86
5	82	82	84	80	84	84	82	78	82	84	86	86	92	92	94	90	88	88	88	86	88	86	86	86	86						
6	69	69	71	75	70	73	66	67	68	68	75	68	67	79	67	65	65	64	68	68	64										
7	68	68	64	66	72	71	74	74	72	72	72	71	70	68	68	64	64	64	64	60	62	60	72	78	72	78					
8	80	80	82	82	84	84	84	88	78	76	76	76	78	80	80	82	88	86													
9	68	68	70	68	72	72	70	68	64	68	70	72	74	78	65	66	74	72	70	80	72	72	78	78	78	80	82	86	72	72	74
10	90	90	82	83	86	93	82	88	74	73	68	62	68	78	78	71	67	70	66	68											
11	82	82	80	82	80	82	80	82	82	84	88	86	88	86	88	86	88	86	86	88											
12	80	80	78	78	78	76	76	74	72	70	72	72	72	71	70	69	72	74	76	78											
13	62	62	64	62	80	82	70	72	70	72	70	70	72	72	70	70	72	70	72	68											
14	72	72	70	68	70	62	72	70	64	64	64	64	72	74	78	76	76	74	72	74	72	70	70	72	70	72	70	72			
15	88	88	86	84	88	82	90	90	90	90	88	88	86	84	72	80	88	84	81												
16	65	65	64	63	60	65	65	65	71	72	73	75	78	81	84	85	84	85	86	88	86	88	84	84	84	84	86				
17	78	78	80	82	84	80	82	88	86	88	86	90	91	91	90	90	92	91	92	91	91	91	90	87	87	87	86	86	86		
18	68	68	64	68	64	64	74	72	72	70	70	68	66	67	66	68	66	78	72	74	74	76	84								
19	64	64	65	64	62	64	68	68	72	70	72	72	74	74	74	80	82	80	80	80	78	78	76	76							
20	77	77	78	77	77	82	80	82	78	73	78	78	82	83	77	73	72	71	72	70	71	70	68	70	72	74	76	76			
21	84	84	82	82	80	82	84	82	84	88	84	82	81	82	81	84	82	82	82	80	82	80									
22	68	68	72	74	68	74	72	70	68	64	62	68	72	71	76	68	64	62	61	60	62	62	62	64	64						
23	72	72	74	76	78	74	76	78	76	78	76	74	68	64	66	62	60	62	68	64	66	64	63	72	70	78					
24	72	72	74	70	68	72	70	68	74	76	72	72	70	71	71	70	72	72	70	70	72	72									
25	86	86	88	88	87	82	83	84	88	87	89	86	88	86	88	86	84	83	82	81	80	88	87	86	88						
26	96	96	90	88	86	84	83	82	86	88	86	88	90	92	90	92	90	80	86	88	88	86	84	84	88	86	88				
27	79	79	71	75	70	73	66	67	78	68	75	68	67	79	67	65	65	64	68	68	64	72	72	78	78	80	82	86			
28	82	82	80	82	82	84	84	84	84	88	86	86	88	86	86	86	84	84	84	84	82	78	78	76	76						
29	70	70	72	70	70	71	74	62	72	69	68	68	71	71	72	72	76	76	76	76	77	78	78	84	88						
30	80	80	78	78	80	82	82	84	84	82	82	81	81	80	78	78	78	80	76	76	78	82	82								

		Time in Mins							BLOOD PRESSURE																							
S No	Basal	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	375	390	405	420	435	450
1	110/70	110/70	120/80	110/70	110/70	110/80	120/80	130/80	110/70	120/80	110/70	120/80	110/70	110/70	120/80	110/70	130/80	120/80	110/70	110/70	110/70	120/80	120/80	120/80	130/80	125/78	120/80	130/80	130/80		
2	118/78	118/78	120/78	120/80	118/78	120/80	120/80	130/80	120/80	118/78	120/80	120/80	120/78	130/80	128/78	118/78	120/80	120/80	118/78	120/80	118/78	118/80	120/80	120/80	120/80	130/80	130/80	140/80	140/80		
3	110/70	110/70	110/70	110/70	120/80	130/80	130/80	128/80	130/70	120/80	110/70	110/70	120/80	118/78	110/78	120/80	128/80	118/78	120/80	130/80	130/80										
4	120/80	120/80	123/80	123/86	117/81	120/80	120/90	120/80	120/80	110/80	116/79	120/80	110/80	123/80	123/80	120/80	117/80	120/80	117/81	119/81	119/80	120/80	120/80	120/70	110/80	116/79	120/80	110/70	110/70	120/80	120/80
5	110/70	110/70	110/68	106/68	114/73	118/90	118/72	118/90	114/73	114/78	123/70	120/80	118/72	118/80	120/80	118/78	110/70	120/80	118/78	114/78	114/78	118/80	120/80	130/90	130/90						
6	113/64	113/64	114/78	115/75	112/81	103/80	101/68	106/68	105/65	106/64	104/63	101/65	106/64	104/73	111/79	103/86	99/63	108/62	118/67	113/60	110/70										
7	130/80	130/80	110/80	120/80	110/70	110/70	120/78	120/80	98/70	98/70	100/70	100/70	100/60	100/60	100/60	110/70	110/70	110/70	120/80	120/80	118/78	110/80	128/80	130/80	130/80	130/80					
8	140/80	140/80	140/80	150/90	140/80	160/90	150/90	140/80	140/80	140/80	150/90	150/90	150/80	140/80	140/80	150/80	150/80	150/80													
9	120/70	120/70	110/80	130/70	130/90	130/70	130/70	120/80	110/68	110/70	110/80	130/80	140/80	130/80	110/70	120/80	130/80	130/80	130/90	130/90	128/78	115/78	120/80	110/70	110/70	120/80	120/70	120/80	110/70	110/80	110/80
10	125/85	125/85	119/81	119/81	123/84	107/71	110/73	115/69	115/69	117/60	98/72	115/72	120/78	130/80	125/80	120/80	121/82	121/82	120/76	116/78											
11	140/80	140/80	130/80	140/80	130/80	130/80	120/80	128/78	130/80	132/80	130/80	130/80	128/78	128/78	120/80	130/80	130/80	130/80	130/80	130/80											
12	100/70	100/70	110/70	110/70	108/68	110/70	110/72	100/70	110/72	118/75	116/78	110/70	110/70	120/80	120/80	110/70	110/70	110/70	110/70	110/70											
13	110/70	110/70	110/70	100/70	110/70	110/72	118/78	118/80	120/80	118/78	116/78	112/70	112/72	110/68	110/70	120/78	110/78	120/80	120/80	120/80											
14	90/70	90/70	90/70	90/70	94/70	94/70	98/70	95/70	96/70	96/70	96/70	96/70	96/70	110/80	110/80	100/70	100/60	110/80	110/70	100/72	100/72	100/70	110/80	100/80	110/80	110/70	110/70				
15	100/70	100/70	100/70	110/70	120/70	120/70	110/70	110/70	110/80	120/70	120/70	110/70	110/70	110/70	110/70	120/80	130/80	140/80	140/80												
16	98/63	98/63	96/60	98/70	100/70	105/69	100/68	110/70	110/70	110/72	110/80	110/80	110/70	110/70	120/80	120/78	130/80	140/78	140/80	130/78	130/80	130/80	130/80	130/80	128/78	130/80	130/80				
17	90/60	90/60	90/60	92/62	99/60	99/59	90/60	100/60	102/63	100/60	110/70	110/70	110/70	110/70	110/70	120/80	120/80	120/80	120/80	120/80	120/80	110/80	110/70	110/80	110/80	110/80	110/80	110/80	120/80		
18	110/70	110/70	108/68	110/70	110/70	100/70	100/70	110/80	100/70	120/80	110/70	120/80	110/70	110/70	120/80	110/80	110/80	110/70	110/80	110/70	110/70	110/70	120/80								
19	100/70	100/70	100/70	110/70	110/68	110/70	130/80	130/80	130/80	130/80	130/80	120/80	110/70	110/70	110/70	100/70	110/70	130/80	120/78	120/80	130/78	130/80	130/80	130/80							
20	110/70	110/70	110/70	120/80	120/80	120/80	110/70	110/70	120/80	130/80	120/70	120/70	110/80	110/80	110/70	120/80	128/78	118/78	120/80	130/80	130/78	130/78	130/80	130/80	130/80	128/78	128/78	128/78			
21	120/70	120/70	110/80	110/80	108/70	110/78	120/80	120/78	130/80	110/78	110/78	110/78	120/80	118/78	120/78	110/78	118/78	108/80	110/80	110/70	110/70	120/80									
22	110/80	110/80	120/80	110/70	120/80	110/80	110/70	120/80	118/78	128/78	120/78	120/80	118/80	118/80	120/80	120/80	130/80	128/78	120/80	130/80	130/80	130/80	130/80	130/80	130/80						
23	110/80	110/80	110/80	120/80	120/80	118/78	120/80	128/78	124/73	131/99	130/90	124/83	130/80	130/80	140/80	140/80	131/97	124/83	124/83	117/77	120/80	110/78	124/83	124/83	130/80	131/90	130/90	130/90			
24	110/70	110/70	120/80	120/80	120/80	120/80	130/80	130/80	128/78	120/80	110/80	120/80	120/80	120/80	120/70	120/80	120/80	130/80	130/80	120/70	128/78	120/80									
25	120/70	120/70	120/80	120/80	110/70	120/70	110/78	120/80	130/80	120/80	110/70	110/78	120/80	110/78	120/80	120/80	120/80	120/80	130/80	130/80	128/78	120/70	130/80	120/80	130/80						
26	118/70	118/70	128/80	120/80	130/80	120/70	128/78	130/80	118/78	110/70	110/70	110/78	120/80	110/78	120/80	120/80	128/80	128/78	130/80	130/80	120/78	128/80	128/80	120/80	130/80	139/80	130/80				
27	130/80	130/80	128/78	120/80	130/80	140/80	138/80	140/80	140/80	130/80	130/80	130/80	130/80	140/80	140/80	140/80	142/78	140/78	138/78	140/80	140/80	140/80	140/80	140/80	130/80						
28	130/80	130/80	130/78	130/80	130/78	128/80	128/78	120/78	118/78	120/80	120/80	130/70	130/78	140/80	130/80/	138/80	140/80	140/78	130/80	130/78	130/70	138/78	138/78	140/80	140/80						
29	108/67	108/67	110/70	110/70	110/70	110/70	110/68	118/78	118/72	118/76	120/80	120/80	120/80	128/78	130/80	130/80	130/80														
30	108/67	108/67	110/70	110/70	110/70	110/70	110/68	118/78	118/72	118/76	120/80	120/80	120/80	128/78	130/80	130/80	130/80														

	Time in Mins							PAIN SCORE																						
S No	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	375	390	405	420	435
1	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	1	1	1	1	1	0	0	0	0	
2	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	2	1	1	1	1	1	0	0	0		
3	0	0	0	0	0	0						1	1	2	2	2	2	2	1	1	1	1	0						
4	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	0	0
5	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	1	1	1	1	0	0	0	0	0					
6	1	2	2	2	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0									
7	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	1	1	1	0	0	0	0				
8	1	1	2	2	2	2	1	1	1	1	1	1	0	0	0	0	0												
9	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	1	1	1	1	1	0	0	0	0
10	0	0	0	0	0	0	1	2	2	2	2	2	1	1	1	0	0	0	0										
11	0	0	0	0	0	0	0	1	1	2	2	2	2	1	1	1	1	0	0	0									
12	0	0	0	0	2	2	2	2	2	1	1	1	1	0	0	0	0	0											
13	0	0	0	0	1	1	2	2	2	1	1	1	1	1	0	0	0	0	0										
14	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	1	1	1	0	0					
15	0	0	0	0	0	0	2	2	2	2	2	1	1	1	1	0													
16	0	0	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	1	1	1	1	0							
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	2	1	1	1	1	0					
18	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	1	1	1	0								
19	0	0	0	0	0	0	1	1	1	2	2	2	2	2	2	1	1	1	1	0									
20	0	0	0	0	0	0	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	0						
21	0	0	0	0	0	0	1	1	1	2	2	2	2	2	2	2	1	1	1	0									
22	0	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	0										
23	0	0	0	0	0	0	0	0	0	1	1	1	2	2	2	2	2	2	1	1	1	1	0						
24	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	2	1	1	1	0								
25	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	1	1	1	1	1	0	0					
26	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	1	1	1	1	1	1	0	0	0			
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	1	1	1	1	0	0	0	0		
28	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	1	1	1	1	1	0	0	0					
29	0	0	0	0	0	0	0	0	0	0	1	0	1	2	1	1	1	1	1	1	0	0	0	0					
30	0	0	0	0	0	0	0	0	0	1	1	1	2	2	2	1	1	1	1	0	0	0							

	Time in Mins						**LEVEL OF MOTOR BLOCK**												
S No	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285
1	B3	B3	B3	B3	B3	B2	B2	B2	B2	B2	B1	B1	B1	B0					
2	B3	B3	B3	B3	B3	B2	B2	B2	B2	B2	B1	B1	B1	B0					
3	B3	B3	B2	B2	B2	B2	B2	B1	B1	B1	B1	B0							
4	B3	B3	B3	B3	B3	B3	B2	B2	B2	B2	B2	B1	B1	B1	B1	B1	B0		
5	B3	B3	B3	B3	B2	B2	B2	B2	B1	B1	B1	B1	B0						
6	B2	B2	B2	B2	B2	B2	B1	B1	B1	B1	B0								
7	B3	B3	B3	B3	B3	B2	B2	B1	B1	B0									
8	B1	B1	B1	B1	B1	B1	B0												
9	B3	B3	B3	B3	B3	B3	B3	B3	B2	B2	B2	B1	B1	B0					
10	B3	B3	B2	B2	B1	B1	B0												
11	B3	B3	B3	B3	B3	B2	B2	B2	B1	B1	B0								
12	B3	B3	B3	B2	B2	B2	B1	B1	B0										
13	B3	B3	B3	B3	B3	B2	B2	B1	B1	B1	B1	B0							
14	B3	B3	B3	B2	B2	B2	B2	B1	B1	B1	B1	B1	B1	B1	B0				
15	B3	B3	B2	B2	B2	B1	B1	B1	B1	B1	B0								
16	B3	B3	B3	B3	B3	B3	B3	B3	B2	B2	B2	B2	B2	B2	B2	B1	B1	B1	B0
17	B3	B3	B3	B3	B3	B3	B2	B2	B2	B2	B2	B1	B1	B1	B0				
18	B3	B3	B3	B3	B3	B2	B2	B2	B1	B1	B1	B1	B1	B1	B0				
19	B3	B3	B3	B3	B2	B2	B2	B1	B1	B1	B1	B1	B0						
20	B3	B3	B3	B3	B3	B3	B3	B2	B2	B1	B1	B1	B0						
21	B3	B3	B3	B2	B2	B2	B1	B1	B1	B0									
22	B3	B3	B3	B3	B3	B2	B2	B2	B2	B1	B1	B0							
23	B3	B3	B3	B3	B3	B2	B2	B2	B2	B2	B1	B1	B1	B1	B1	B0			
24	B3	B3	B3	B3	B3	B2	B2	B2	B2	B1	B0	B0							
25	B3	B3	B3	B3	B2	B2	B2	B2	B2	B1	B1	B1	B1	B0					
26	B3	B3	B3	B3	B2	B2	B2	B2	B2	B1	B1	B1	B1	B1	B0				
27	B3	B3	B3	B2	B2	B2	B2	B2	B1	B1	B1	B1	B1	B0					
28	B3	B3	B3	B3	B3	B2	B2	B2	B2	B2	B2	B1	B1	B1	B0				
29	B3	B3	B3	B3	B2	B2	B2	B2	B1	B1	B1	B1	B1	B0					
30	B3	B3	B3	B3	B2	B2	B2	B2	B2	B1	B1	B1	B1	B0					

	Time in Mins									LEVEL OF SENSORY BLOCK																				
S.NO	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	375	390	405	420	435	450
1	T6	T6	T8	T8	T8	T10	T10	T10	T10	T12	T12	T12	T12	L1	L1	L2	L2	L3	L3	L3	L4	L4	L5	L5	L5	S1				
2	T6	T8	T8	T8	T8	T10	T10	T10	T12	T12	T12	T12	L1	L1	L1	L2	L2	L2	L3	L3	L3	L4	L4	L4	L4	L5	L5	S1		
3	T6	T8	T8	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L3	L4	L4	L4	L5	L5	S1										
4	T6	T6	T8	T8	T8	T10	T10	T10	T10	T12	T12	T12	L1	L1	L1	L1	L1	L1	L2	L2	L3	L3	L3	L4	L4	L4	L5	L5	L5	S1
5	T6	T8	T6	T6	T6	T8	T8	T8	T8	T8	T10	T10	T12	T12	L1	L1	L2	L2	L3	L4	L4	L5	L5	S1						
6	T6	T8	T8	T10	T10	T12	T12	L1	L2	L2	L2	L2	L3	L3	L3	L4	L4	L5	L5	S1										
7	T6	T8	T8	T10	T10	T12	T12	T12	T12	L1	L1	L1	L1	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1						
8	T10	T10	T10	T12	T12	L1	L2	L2	L3	L3	L4	L4	L4	L4	L5	L5	S1													
9	T6	T6	T6	T8	T8	T8	T10	T10	T10	T12	T12	L1	L1	L2	L2	L2	L2	L2	L2	L3	L3	L3	L3	L4	L4	L4	L4	L5	L5	S1
10	T8	T8	T10	T10	T12	T12	T12	L1	L1	L1	L2	L3	L3	L4	L4	L5	L5	S1												
11	T6	T6	T6	T8	T8	T8	T10	T10	T12	T12	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1										
12	T8	T8	T10	T10	T12	T12	L1	L1	L2	L2	L2	L3	L3	L3	L4	L4	L5	S1												
13	T8	T8	T10	T10	T12	T12	T12	T12	L1	L1	L2	L3	L3	L4	L4	L5	L5	L5	S1											
14	T6	T6	T6	T8	T8	T8	T8	T10	T10	T10	T12	T12	L1	L2	L2	L2	L3	L3	L3	L4	L4	L4	L5	L5	L5	S1				
15	T8	T8	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	L5	S1												
16	T6	T6	T6	T10	T8	T8	T8	T8	T10	T10	T10	T10	T12	T12	L1	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1				
17	T6	T6	T6	T8	T8	T8	T8	T10	T10	T10	T10	T12	T12	T12	L1	L1	L1	L2	L2	L3	L3	L4	L4	L4	L5	L5	L5	S1		
18	T6	T6	T6	T8	T8	T8	T10	T10	T12	T12	L1L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	L5	S1								
19	T8	T8	T10	T10	T10	T12	T12	T12	L1	L1	T12	L2	L2	L2	L2	L3	L3	L3	L4	L4	L5	L5	S1							
20	T6	T6	T6	T8	T8	T8	T8	T10	T10	T10	L1	T12	T12	T12	L1	L1	L1	L2	L2	L2	L3	L3	L4	L4	L5	L5	S1			
21	T6	T8	T8	T8	T10	T10	T12	T12	L1	L1	T12	L2	L2	L2	L3	L3	L4	L4	L5	L5	S1									
22	T6	T6	T6	T6	T8	T8	T8	T10	T10	T12	T12	L1	L1	L1	L2	L2	L2	L3	L3	L4	L4	L5	L5	S1						
23	T6	T6	T6	T8	T8	T8	T8	T10	T10	T10	T12	T12	T12	L1	L1	L2	L2	L2	L2	L3	L3	L4	L4	L5	L5	S1				
24	T6	T6	T6	T8	T8	T10	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1									
25	T6	T6	T6	T6	T6	T6	T8	T8	T10	T10	T12	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1						
26	T6	T6	T8	T8	T8	T10	T10	T12	T12	T12	L1	L1	L1	L2	L2	L2	L3	L3	L3	L4	L4	L4	L5	L5	L5	S1				
27	T6	T6	T6	T8	T8	T8	T10	T10	T10	T12	T12	T12	L1	L1	L1	L2	L2	L2	L3	L3	L4	L4	L5	L5	L5	S1				
28	T6	T6	T8	T8	T8	T8	T10	T10	T10	T12	T12	T12	L1	L1	L1	L2	L2	L3	L3	L4	L4	L5	L5	S1						
29	T6	T6	T8	T8	T8	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L4	L4	L4	L5	L5	L5	L5	L5	S1						
30	T6	T6	T8	T8	T10	T10	T12	T12	L1	L1	L2	L2	L3	L3	L3	L4	L4	L4	L5	L5	L5	S1								

INTRAOP VITALS MONITORING GROUP D

		Time in Mins					HEART RATE																						
SL.NO	Basal	5	10	15	20	25	30	35	40	45	60	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145
1	97	97	94	94	90	92	88	86	87	81	80	80	84	86	82	81	70	77	76	78	80									
2	88	88	86	84	79	75	79	77	78	77	79	77	78	75	75	74	73													
3	85	85	88	79	76	87	86	76	86	76	86	78	84	83	73	73	74	72	72	71	80									
4	96	96	98	94	92	90	88	84	80	82	81	80	82																	
5	82	82	84	80	82	84	80	76	76	76	73	60	47	60	68	70	72	70												
6	98	98	89	96	82	82	84	88	85	94	76	71	80	70	80	70	88	78	80	82	84	72	72	84	76	76	76	72	70	80
7	81	81	80	78	78	76	74	74	76	67	65	64	66	64	64	78	68													
8	80	80	76	74	76	76	71	76	74	74	74	79	71	72	77	77	83	74	69	74	74	74	85	85	82	89	88	86	80	80
9	100	100	86	84	84	84	75	84	74	72	72	79	75	74	72	72	72	70	71	72	72									
10	105	105	91	80	78	73	71	72	74	75	75	78	78	81	84	85	82	80	81	84	78	85	86							
11	90	90	91	89	88	86	88	96	97	98	97	84	88	89	90	82	80	81	87	86	86	84	83	82	80					
12	80	80	76	72	74	76	72	75	75	77	86	74	75	69	78	78	80	77	78	82	79									
13	113	113	98	95	98	99	86	77	76	81	89	79	82	84	79	82	82	83	80	84	77									
14	110	110	105	83	106	83	86	86	63	46	70	72	70	85	82	88	89	88	86	88	84									
15	104	104	103	102	98	99	92	92	91	91	101	102	102	101	101	96	97	97	97	97	99									
16	80	80	86	79	78	71	78	71	70	65	69	68	68																	
17	90	90	80	82	84	84	82	78	78	78	83	82	80	83	83	82	80	81	82											
18	74	74	74	89	93	88	84	86	85	87	81	79	79	78	78	78	74	74	72	78	74									
19	71	71	68	64	64	64	64	64	63	62	60	69	72	82	60	67	68	68	62	62	62	59	66	66	66	66	66			
20	78	78	75	74	74	74	71	72	76	81	81	79	78	71	76	78	74	72	70	66	66									
21	110	110	104	96	98	94	80	82	80	78	78	70	82	85	84	83	79	82	79	70	83	83	70	79						
22	69	69	62	68	70	72	64	68	62	62	64	62	65	66	68	62	60													
23	65	65	64	63	62	60	60	62	64	62	68	68	68	65	60	65	64	63	62	60										
24	76	76	77	72	77	68	70	72	74	73	72	72	72	73	72	70	68	68	67	68	70									
25	76	76	77	72	77	68	70	72	74	73	72	72	72	73	72	70	68													
26	88	88	86	84	79	75	79	77	78	77	79	77	78	75																
27	80	80	80	78	78	76	74	76	76	76	79	75	71	72	70															
28	92	92	91	88	86	77	75	74	68	62	49	68	72	77																
29	76	76	77	74	72	70	75	74	73	72	76	78	80	72	74	71	70													
30	72	72	72	70	76	74	71	72	70	72	68	70	68	74	76															

		Time in Mins					BLOOD PRESSURE																							
S.NO	Basal	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145
1	150/90	150/90	150/90	143/98	134/100	138/94	138/94	116/91	126/88	120/90	129/88	130/86	116/80	110/80	130/80	128/80	129/90	130/80	120/80	128/80	116/80									
2	150/90	150/90	140/80	130/80	140/80	160/90	140/90	130/80	140/80	150/80	140/80	130/80	120/80	120/80	120/80	120/80	110/70													
3	150/90	150/90	145/80	160/80	130/80	106/73	104/72	97/67	97/70	96/67	100/67	97/64	100/67	102/79	101/66	99/63	106/73	104/72	130/80	120/80	110/80									
4	160/90	160/90	160/90	150/90	140/80	128/83	128/75	116/61	128/83	120/80	116/61	110/70	120/80	128/83																
5	140/90	140/90	120/80	100/60	100/60	118/72	118/70	115/78	114/73	110/70	102/65	100/70	106/68	100/70	106/68	110/68	104/73	110/70												
6	111/65	111/65	113/79	106/69	122/71	108/76	112/70	96/53	91/59	109/65	98/60	101/57	108/69	102/65	102/66	107/61	101/57	112/67	99/58	101/76	105/54	101/68	97/62	94/47	99/55	94/56	92/54	90/50	90/60	100/70
7	150/90	150/90	141/90	122/75	107/74	102/68	105/73	104/78	96/71	105/69	98/65	96/66	94/66	92/63	95/66	92/64	102/71													
8	140/80	140/80	130/78	120/80	140/80	140/78	150/80	120/78	130/70	120/78	130/80	130/80	110/70	130/80	130/80	120/78	130/80	130/80	120/78	130/80	110/70	110/70	120/70	120/70	120/78	110/70	100/70	100/70	110/70	110/70
9	140/90	140/90	135/80	135/80	128/74	128/74	111/72	119/71	121/66	120/72	121/66	119/71	117/71	119/71	116/71	116/70	118/80	120/80	120/80											
10	100/80	100/80	116/72	98/60	99/58	108/69	108/69	112/67	115/70	115/73	115/70	112/70	114/74	112/72	110/75	113/78	112/82	118/82	118/81	115/81	119/75	114/83	111/76							
11	135/99	135/99	126/91	107/76	113/84	111/82	111/80	114/83	106/81	105/76	108/78	109/69	103/70	109/69	107/60	110/66	106/67	113/76	111/68	123/75	109/66	113/76	105/86	111/86	109/66					
12	120/80	120/80	117/70	110/70	109/65	109/67	109/65	109/65	106/72	103/59	100/71	97/57	93/53	88/40	94/50	96/47	103/58	103/59	103/58	88/52	102/59									
13	150/90	150/90	140/90	130/90	120/80	124/78	113/67	113/67	105/67	109/67	104/64	109/74	101/67	109/74	108/66	107/63	99/66	98/67	110/70	110/72	120/80									
14	144/88	144/88	130/81	130/75	117/66	108/71	107/68	107/67	106/62	106/62	103/61	106/68	103/54	94/54	98/55	98/58	100/60	108/68	108/68	103/54	110/70									
15	154/85	154/85	145/76	130/75	124/71	123/71	123/71	123/71	124/74	117/71	105/65	111/69	120/69	122/73	117/72	117/69	117/71	122/72	121/72	120/79	121/71									
16	150/90	150/90	130/80	110/60	103/77	104/64	105/69	102/66	102/66	102/66	98/63	98/63	98/63																	
17	140/80	140/80	150/90	120/70	95/55	100/60	102/63	99/59	99/54	101/63	93/65	87/53	92/58	101/63	100/60	101/63	90/55	90/60	100/60											
18	134/88	134/88	134/88	135/77	123/81	125/77	123/81	125/77	125/77	117/64	113/72	110/67	105/67	108/67	110/67	110/67	108/67	112/67	112/67	105/69	104/68									
19	130/80	130/80	110/76	109/75	123/74	103/78	114/60	116/87	103/73	105/67	105/60	105/67	112/61	108/71	114/63	122/67	114/79	122/78	121/75	121/73	120/77	116/81	120/80	120/80	120/80					
20	130/77	130/77	129/87	134/83	124/69	115/72	108/67	105/63	107/62	105/58	104/58	101/56	108/60	102/54	112/70	104/67	104/67	115/72	108/67	105/63	107/62									
21	137/82	137/82	131/93	150/80	107/71	100/71	99/72	100/68	100/68	100/70	80/60	100/68	98/68	103/68	80/60	100/70	110/70	110/70	100/71	100/71	100/71	110/70	120/80	120/80						
22	140/90	140/90	130/80	120/70	110/70	110/70	110/72	110/70	100/60	110/70	120/80	110/72	110/70	112/78	120/80	110/70	110/70													
23	140/80	140/80	130/96	131/99	131/97	124/83	124/83	124/83	117/77	114/72	113/72	111/70	110/70	120/80	130/80	131/97	124/83	120/80	124/83											
24	150/80	150/80	138/87	139/96	134/85	122/86	125/84	124/78	122/86	120/82	113/77	111/70	115/77	122/80	125/84	124/78	122/80	120/82	113/77	110/70	120/80									
25	130/80	130/80	120/80	117/80	118/70	103/78	110/70	110/72	108/67	116/61	110/70	112/68	110/70	118/68	120/72	128/70	110/78													
26	140/90	140/90	142/78	140/80	130/80	120/70	126/72	110/70	118/78	106/73	108/70	100/67	110/70	110/70																
27	150/90	150/90	150/90	148/78	140/70	148/88	150/80	150/80	150/80	140/90	130/70	130/80	120/80	120/80	120/80															
28	111/70	111/70	113/69	106/69	100/60	98/68	98/68	97/67	97/70	100/64	97/64	118/78	102/70	102/79																
29	135/99	135/99	126/91	120/90	112/71	104/67	104/72	97/67	97/70	100/67	97/64	100/67	102/79	101/66	101/66	101/66														
30	120/80	120/80	110/70	117/70	109/65	109/67	109/65	108/69	104/78	96/67	96/66	98/60	100/67	100/67	110/70															

	Time in Mins						ADVERSE EFFECTS																					
S.No	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	375	390	405	420	435
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3	NV	NV	NV	NV	NV	NV	NV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
4	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
6	NV	NV	NV	NV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
7	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
8	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
9	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	NV	NV	NV	NV	NV	0	0	0	0	0	0	NV	NV	0	0	0	0	0	0										
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0										
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
16	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

	Time in Mins					RSS																					
S.NO	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	375	390	405	420	435
1	3	3	3	3	3	3	3	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
2	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2						
4	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
5	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
6	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
7	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2						
8	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2												
9	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
10	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2										
11	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2									
12	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2										
13	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2										
14	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
15	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2												
16	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
17	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
18	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2							
19	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2						
20	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
21	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2								
22	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
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27	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
28	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
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	Time in Mins						SIDE EFFECTS																							
SL.NO	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150
1	NIL	NIL	NIL	NIL	NL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL										
2	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL														
3	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL										
4	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL																		
5	NIL	NIL	NIL	NIL	N	NIL	NIL	NIL	NIL	NIL	NIL	B	NIL	NIL	NIL	NIL	NIL													
6	NIL	NIL	NIL	NIL	NIL	NIL	NV	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NV	NIL	NIL	NIL	NIL	NIL	NIL	NIL
7	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL													
8	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
9	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL										
10	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL								
11	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL												
12	NIL	NIL	NIL	NIL	NL	NIL	NIL	NIL	NIL	NIL	NIL	NV	NIL	NIL	NIL	NIL	NIL	NIL	NV	NIL			NIL							
13	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL		NIL										
14	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	B	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL		NL										
15	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL												
16	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL																
17	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	H	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL											
18	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL		NIL										
19	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL								NL				
20	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL		NIL										
21	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	H	NIL	NIL	NIL	H	NIL	NIL	NIL				NIL								
22	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL												
23	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL											
24	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL		NIL										
25	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL												
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27	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL															
28	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	B	NIL																
29	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL														
30	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL																

	Time in Mins						RSS																						
SL.NO	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145
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3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2									
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7	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2													
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9	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2									
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27	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2													
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30	2	2	2	2	2	2	2	3	2	2	2	2	2	2															

	Time in Mins						RESPIRATORY RATE																						
S.NO	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145
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2	14	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12													
3	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14									
4	12	12	12	12	12	12	12	12	12	12	12	12																	
5	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12												
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7	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14													
8	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
9	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12									
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11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12							
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13	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14									
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17	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12											
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19	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14				
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27	14	14	16	16	16	17	17	16	16	14	14	12	12	12															
28	14	14	14	14	14	12	12	12	12	12	12	13	12																
29	16	14	14	16	14	14	12	12	12	12	12	12	12	12	12	12													
30	13	14	14	12	12	12	12	14	14	14	12	12	14	14															

	Time in Mins							SPO2																					
SL.NO	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145
1	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%									
2	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%													
3	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%									
4	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%																	
5	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%												
6	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
7	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%												
8	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
9	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%									
10	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%							
11	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%							
12	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%									
13	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%									
14	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%									
15	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%											
16	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%																	
17	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%											
18	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%									
19	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%				
20	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%									
21	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%						
22	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%													
23	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%										
24	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%									
25	99%	99%	98%	100%	99%	99%	98%	99%	99%	98%	99%	99%	99%	100%	99%	99%													
26	99%	99%	98%	99%	100%	99%	99%	98%	99%	98%	98%	99%	99%																
27	99%	99%	99%	98%	99%	98%	99%	97%	99%	99%	99%	98%	99%	99%															
28	100%	99%	99%	99%	98%	100%	97%	99%	99%	99%	98%	98%	99%																
29	100%	99%	99%	99%	98%	99%	98%	98%	99%	99%	98%	98%	97%	98%	99%	98%													
30	97%	98%	99%	99%	98%	99%	99%	99%	99%	99%	98%	98%	99%	99%															